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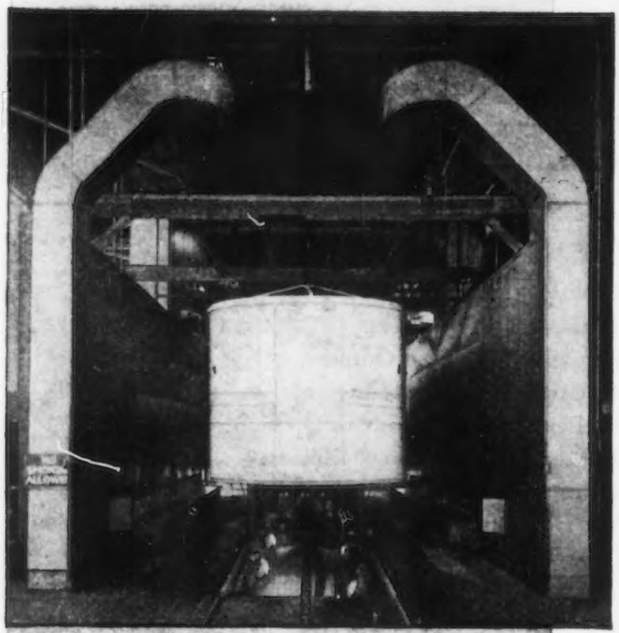

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Our Cake

"WE cannot eat our cake and have it." The speaker is Sir Stafford Cripps, the place London, the time Apr. 6, and the audience "a glum House of Commons." Sir Stafford is presenting the budget. With blunt honesty he is telling the nation, and most particularly his own party, that subsidies which disguise the real cost of food, social services to enhance the real incomes of the weak, and adequate defense to protect England, must come out of the hides of taxpayers.

This is a budgetary Sermon on the Mount. It states realities which naive do-gooders and adroit politicians always evade. Sir Stafford has been anathema to conservatives the world over. A first class mind, exceptional energy, a high order of integrity, conspicuous courage—with these qualities Cripps has led England down the road of socialism. The Bank of England, the cables, the airlines, electric power, gas, transport, and coal have been nationalized. Steel is next.

Medicine has become a public service. The cost of living has been kept from reflecting higher production costs by subsidies of £485,000,000, approximately one-seventh of the total budget. The National Health Service, costing far more than anticipated, accounts for another 8 pct of the outlay. Security "from the cradle to the grave" calls for a further substantial slice of the government's income.

Entirely aside from the nagging servitude to forms, questionnaires, reports and queues to which the average Englishman is subjected, the real cost of the welfare state has been presented by the austere Cripps for the first time. Here at last is a candid price tag attached to security and social justice.

Two other aspects of the revealing message deserve attention. The TIMES dispatch from London states: "No changes were made in the income and purchase taxes, which had been the objects of the greatest hopes of those who had been crying for relief from taxation and the rising cost of living." To these Sir Stafford said: "We have . . . to face the fact that as long as the defense forces and social services are maintained—whatever government is in power—a very high rate of taxation will continue to be necessary."

The Chancellor also warned that the rich had been sucked dry by special inheritance and income levies, that added social services can come only out of greater national productivity.

The message boils down to this. No economic or financial magic can provide social service out of thin air. The fat on the backs of the rich is a limited reservoir that has already been exhausted. To give a large segment of the population something which it does not earn means that those who do earn their own keep must work that much harder.

In all the earlier experiments with socialism and communism, attempted with limited groups, these elementary axioms were immediately demonstrated and Utopia forthwith fell flat on its face. In larger, complex communities the income tax and inflation postponed realization. Cripps has been too honest to print money. The rich are no longer rich. The followers of Labor may be dismayed and disillusioned, but truth has gained.

Joseph Stagg Lawrence

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METALLURGY SALES OPERATIONS

► Some small businesses are far ahead of large firms in cutting expenses. Because they operate on smaller margins, many times they have had to draw in their horns. They are doing it. Every kind of expense is going under the glass. Where cuts are possible they are made quickly. Inventories are being reduced. Work forces are trimmed where possible. Attempts are being made to step up worker efficiency. When the actions of these small firms are multiplied the results will be substantial.

► Some manufacturers have worked out an arrangement with their union that non-productive workers can be dropped first regardless of seniority. Such an arrangement is reported to have been very profitable in building up labor productivity.

► Sponge iron test runs conducted using Canadian Steep Rock ore in the Wiberg-Soderfors process indicate potential of applying this process in certain localities in Canada and the United States. End use for sponge iron would be as substitute for scrap in making quality steels.

► The Hollinger-Hanna, Quebec-Labrador iron ore project is still far from the actual movement of ore. The method of financing the $200 million railroad, ore mining equipment, power plant and ore loading docks is yet to be decided. However, an all season road from Seven Islands, P. Q., to tunnel sites near the Moisie Canyon has been constructed. Work is under way on a winter tote road which closely follows the proposed railway route over 100 miles of rough terrain between Seven Islands and Wacauna Lake. Latest official figure on proved high grade ore is 323,828,000 gross tons.

► Indications of the increase in barge shipments can be judged from the shipping records of a large Pittsburgh mill. Last year this mill shipped a total of 16,000 net tons down the Ohio River. In one week in March of this year the same mill shipped 3500 net tons by barge.

► Investigations in machining die steels have proved the feasibility of hot-milling. The process involves machining the part while it is at temperatures in the range of 1100° to 1500° F. Experiments in milling using carbide and cast alloy cutters showed definite reduction in power requirements, faster cutting speeds, heavier feeds and excellent tool life.

In tool life tests on carbide tipped milling cutters, the same number of passes were completed when milling heated workpieces at high feed rates as achieved when milling the same workpieces at room temperatures at only 12.5 pct the feed rate.

In a heated state, the power requirements for milling die steels at any given feed were approximately 25 pct of those for milling the same steel in its "as received" state.

► Steel scrap collection machinery is grinding to a halt in many areas because prices are below OPA levels. Although this could prove costly in case of suddenly intensified demand the problem is overshadowed today by the job of finding a market for the tremendous tonnages of scrap still being generated by steel fabricators.

► The drive for strategic stockpiling of foreign scrap is picking up momentum. Latest move is the Munitions Board's request that the Scrap Subcommittee of the Iron and Steel Industry Advisory Committee draw up recommendations on that subject. Such a program would assure continued movement of foreign scrap to this country, at the same time relieving consumers of the need for high priced contracts to bring it here. Stockpiling scrap might prove a future bulwark against rebounding prices.

► A laboratory production unit for making 99.99+ pure titanium used in basic research has been developed which produces the metal at a cost of but $25 to $30 per lb. Cost per lb by former methods used to make pure titanium runs between $100 and $200.

► Economies in steel and higher production rates can be expected from industry standardization on hex head machine bolts and nuts. This development will require some time for large scale replacement of square heading tools. Industry members forecast hex head standardization within 5 years.

► Steel producers and buyers are going to check rumors before they believe anything on lower steel prices this year. In 1938 a host of rumors brought the price of steel down $4 to $7 a ton more than the first cut really amounted to. Rumors stirred the price pot until some steel firms cut prices without making sure whether or not their competitors had cut the amount which had been booted around in buyers' circles. No repeats of this mixup are expected when and if current base prices are tested.

The Turbo-Hearth

—a new steelmaking technique

Development of a method for the rapid production of steel of openhearth quality, low in nitrogen and phosphorus, is described in this report by E. C. Bain, vice-president, Carnegie-Illinois Steel Corp., and H. W. Graham, vice-president, Jones & Laughlin Steel Corp. This method, which combines the primary advantages of the openhearth and the bessemer, has, by joint enterprise, been developed to the point that its sponsors are confident that the future will see this unit employed to produce low nitrogen, low phosphorus steel in commercial quantities from basic iron.

PROMISING results of preliminary research in developing a method of steelmaking that permits rapid production of steel of openhearth quality low in phosphorus and low in nitrogen have been achieved by Carnegie-Illinois Steel Corp., and Jones & Laughlin Steel Corp.

The low phosphorus, low nitrogen content is achieved by turbulence produced by jets of air impinging on a bath of liquid pig iron. This characteristic of the process has led to the identifying of the melting unit as a "turbo-hearth."

FIG. 1—The 1000-lb basic lined experimental Turbo-Hearth. The opening is for taking samples of slag and metal without interfering with the progress of the heat. Below this door is a row of seven observation ports.

The development of the process stems from the extensive pilot and production experiments with acid side-blow converter units conducted by Jones & Laughlin Steel Corp., and basic side-blown development work at Battelle Memorial Institute conducted by Carnegie-Illinois, the latter being based on a proposal of C. E. Sims of Battelle. The cooperative pooling of this research has enabled engineers of these organizations to develop the fundamentals of a steelmaking technique that shows possibility of evolving into a significant contribution to this field of metallurgy.

The metallurgical feasibility of the process has

been demonstrated by preliminary tests using small scale units. These tests furnished sufficient background for the design and construction of a full-size furnace in which operating problems may be experimentally studied.

The basic openhearth and the acid bessemer processes possess certain inherent advantages, universally recognized and applied. The acid bessemer was the first major tonnage producer and in the latter part of the 19th century accounted for three quarters of the ingot tonnage produced in the United States. Shortly after the turn of the century, the process began losing ground to the basic openhearth. This decline continued until in 1947 the bessemer occupied a secondary, but still significant, position in the nation's steelmaking economy, accounting for 5 pct of the ingot tonnage produced.

Some of the important factors contributing to this change were. (1) The greater degree of integration necessary for bessemer operation; (2) the capacity of the openhearth for profitable utilization of iron and steel scrap; (3) the demonstrated ability of the basic openhearth process to produce quality steel in large tonnages and at competitive costs, and (4) certain inherent properties of bessemer steel, now attributed to the high nitrogen and phosphorus contents, which made it less suitable than basic openhearth steel for certain applications.

Bessemer Operational Aspects

Thus over the years the basic openhearth process has established itself as the nation's major ingot producer, despite the fact that it does possess some inherent disadvantages. It requires fuel from an external source, which the bessemer process does not, and it produces steel at a comparatively slow rate, since the chemical reactions involved are controlled by diffusion mechanisms in a heterogeneous system. The new turbo-hearth method is an attempt to combine the primary advantages of the two processes.

It has been mentioned that one of the factors contributing to the decline of the use of the acid bessemer process was the limiting influence of certain inherent properties upon its field of application. Acid bessemer steel is well suited for products such as tin plate, free-machining steels, wire, and pipe. In some other applications, however, the added stiffness and higher yield point imparted by the phosphorus and nitrogen contents are not desirable. The higher nitrogen content in bessemer steel, ranging from 0.010 to 0.018 pct, as compared with 0.003 to 0.006 pct in basic openhearth steel, is caused by absorption of nitrogen from the air blown through the molten iron during refining and is inherent in the process. Similarly, phosphorus is higher in acid bessemer steel because no basic oxides are available to hold the oxide of phosphorus in the slag. The addition of a substantial quantity of aluminum, following recarburization of the blown metal, produces steel of admirable quality for certain applications, but this thorough killing precludes the conventional utilization of rimmed or semi-killed bessemer ingot practices with the attendant manufacturing and metallurgical advantages.

In Europe, where readily available ores produced iron with a very high phosphorus content, the Thomas, or basic bessemer process, was developed. This process utilizes a converter almost identical with the familiar bessemer vessel, except that its refractories are basic. Phosphorus can be eliminated in this process because sufficient basic flux is provided to counteract the acid slag-forming impurities. The nitrogen content of the steel, however, is as high as in the product from a silica-lined converter.

The acid bessemer and the basic Thomas processes have an advantage over other steelmaking processes in that neither requires fuel from an external source. The choice between them depends on the relative silicon and phosphorus contents of the iron that can be produced from the ores available in the district. The exothermic reactions between the oxygen in the blast and the several elements in the liquid iron charge supply enough heat units to produce steel with sufficiently high temperature for subsequent finishing and teeming. In the Thomas process, the large content of phosphorus (not under 1.7 pct in the iron) combining with oxygen, supplies a substantial proportion of the needed heat.

Considerable study has been devoted to the possibilities of improving the bessemer process to produce steel with properties that would permit wider application. An appraisal of the various factors involved made apparent the need for some fundamental change if full advantage were to be taken of the desirable features of the bessemer process.

The high silicon iron used in the bessemer converter and the high phosphorus iron used in Thomas operation are required in these processes largely because carbon, the predominating heat producing element in the charge, is not completely utilized. Combustion of carbon in the vessel proceeds only to the carbon monoxide stage, so that two-thirds of the potential heat from the combustion of carbon is lost when the monoxide burns to carbon dioxide in the air outside the vessel. Conservation of this heat has been practiced for years by producers of small, intricate castings. This has been accomplished with low phosphorus iron and without excessive silicon by introducing the air at the side or onto the surface of the converter charge in such a manner that sufficient oxygen is available to burn the carbon to carbon dioxide inside the vessel.

Joint Research Efforts

These facts suggested that it should be possible, by directing jets of air onto the surface of liquid iron, to utilize the extra heat from the more complete combustion of carbon to produce steel from American basic pig iron. The turbulence created by the impinging air could be expected to greatly accelerate the refining reactions. The possible applications for such a process would be: (1) The production in an acid lined vessel of low nitrogen steel; (2) the utilization of conserved heat to melt larger amounts of scrap

(when such scrap use is desirable); and (3) the use of a basic lining for producing steel low in both phosphorus and nitrogen contents.

Jones & Laughlin research in connection with the first two of these phases had progressed to the extent that, in 1942, a specially designed acid-lined side-blown converter of 3½ tons nominal capacity was installed at the Aliquippa Works. Approximately 200 blows were produced and a large percentage of the ingots converted to commercial products in the plant rolling mills. The consistently low nitrogen contents obtained and the favorable metallurgical properties of the steel were sufficiently promising to warrant the construction of a full-scale converter as the next stage in the development. Accordingly, a vessel of 22 tons nominal capacity was designed and constructed for operation in one of the mill converter stands. The initial trial of this converter was delayed by the war, but late in 1946 the acid-lined vessel was operated at the Aliquippa Works and produced a number of blows for both duplex metal and steel ingots.

Carnegie-Illinois technologists approached the problem of making low nitrogen, low phosphorus openhearth quality steel from pig iron of a composition normally used in the basic openhearth by directing jets of air onto the bath of pig iron in a basic-lined vessel. With the benefit of the technical proposals of Battelle Memorial Institute a cooperative project was inaugurated to develop the possibilities of such a process.

Experimental Unit Constructed

A turbo-hearth of 1000 lb capacity, shown in fig. 1, was constructed with special facilities for making temperature measurements and taking samples of slag, metal and gases at any time without interfering with the progress of the operation. A sufficient number of trials were made during 1947 and 1948 to establish certain of the fundamental operating and metallurgical characteristics of this new process.

The question was whether or not iron normally used for basic openhearths, containing about 4 pct C, 1.5 pct Mn, 1 pct Si and 0.25 pct P, would supply enough heat units to support the process and fuse the relatively large amount of basic flux that would be required. When it was established that the substantially complete combustion of carbon inside the vessel would furnish more than ample heat, other variables, such as composition of the iron, temperature, rate of blowing, and time and methods of making additions were studied. A typical analysis of a charge and of the product, such as given in table I, established that the chemical concept of the process was sound.

TABLE I
Typical Analysis of a Charge and the Product Produced in the Turbo-Hearth

	C	Mn	P	Si	N
Charge	3.94	1.48	0.292	1.00	0.003
Product	0.03	0.10	0.017	0.01	0.003

It will be noted that in addition to a substantial reduction in phosphorus, the nitrogen content, which remained unchanged, is representative of values encountered in basic openhearth practice.

In the course of the development work the interests of Carnegie-Illinois and of Jones & Laughlin converged and it seemed mutually advantageous to conduct further research on a joint basis. The encouraging results obtained with the small turbo-hearth and the availability of the Jones & Laughlin commercial-size unit led to its installation and relining with basic refractories at the South Works of Carnegie-Illinois Steel Corp. The larger vessel performed metallurgically as expected and low nitrogen, low phosphorus steels were produced from basic pig iron of average composition.

Operating difficulties, such as are generally associated with the development of a new process during the transition from a pilot plant stage to producing unit, have not yet been completely overcome. A basic lining, once it has become heated, must be kept hot; consequently, in the course of the experimental operation, special burners were required to avoid excessive cooling between heats. Another problem arose from the large additions of flux. A steelmaking process based on 100 pct pig iron in the charge requires almost twice as much flux as scrap consuming processes. This causes an increase in slag volume, and the composition and viscosity of this slag must be carefully controlled to prevent excessive losses by slopping. The problem of separating the slag and metal so that additions could be made without reversion of phosphorus has not been completely solved.

Experience gained during this work shows that the turbo-hearth process is fundamentally sound, and, while the several operating problems will require further study, none of these appears to be insurmountable. The design of the equipment will no doubt be modified as experience is gained during subsequent campaigns. Its sponsors believe that the theory has been amply confirmed that low nitrogen, low phosphorus steel can be made by this new process in commercial quantities from basic iron.

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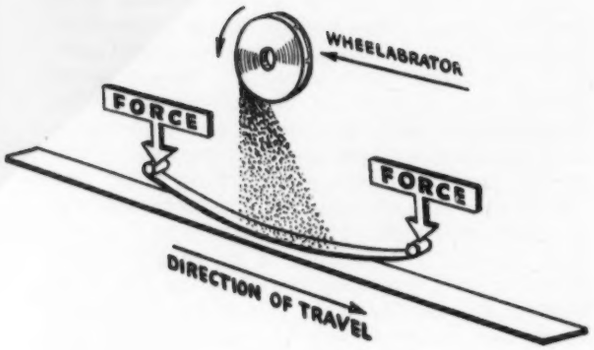
STRESS PEENING



• Schematic illustration of application of stress to spring while Wheelapeening.

SHOT peening has been used extensively for increasing fatigue strength of machine parts. Since the beginning of the application of this process in production, a great deal of investigation has been devoted to determining the influence of factors responsible for the increase in fatigue strength. Some of these investigations have led to the development of methods of shot peening that further increase the effectiveness of the process.

The method of shot peening with which this discussion deals is one in which the increase in fatigue strength is striking even when compared with the fatigue strength of conventionally peened parts. Investigations at the American Wheelabrator & Equipment Corp. have verified the results of initial tests that demonstrated that this particular process of shot peening goes far beyond the results obtained by conventional peening.

This process has been referred to as *Stress Peening* because it consists of shot peening while the part is statically stressed in the same direction as the stress to be sustained in service. The same technique is used as in conventional peening, except for the application of static stress during the process. Fig. 1 shows the method of application of the static load during the peening of specimens for tests described herein. A coil spring would be subjected to a load to compress

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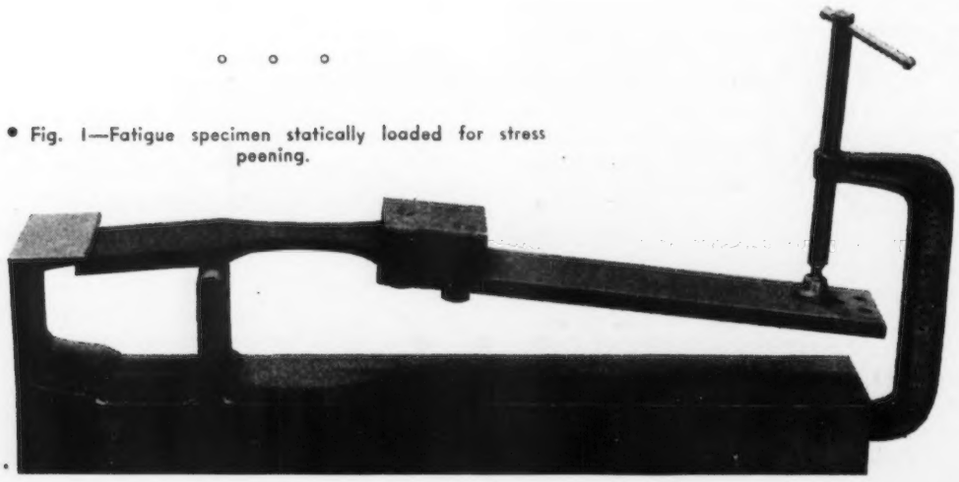
• Fig. 1—Fatigue specimen statically loaded for stress peening.



Stress peening, a process of shot peening while the part is statically stressed in the same direction as the stress to be sustained in service, gives some substantial improvement in fatigue strength. Results of investigations of stress peening, as well as the theory of the process, are discussed by the authors.

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By JOHN C. STRAUB
Chief Research Engineer,
and
DON MAY, JR.
Research Engineer,
American Wheelabrator & Equipment Corp., Mishawaka, Ind.

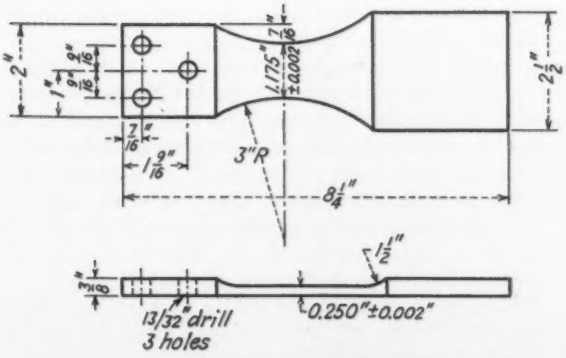
o o o

it during peening. The release of the external load after peening adds further residual stresses to those already imparted by the impact of the shot.

Stress peening is applicable to any part that is subjected to repeated stresses of high magnitude in simple bending or torsion, provided the part can be stressed during peening in the same sense as the stress to be sustained in service. Simple bending or torsion involves repeated stresses not completely reversed. Such parts might include leaf springs, coil springs, torsion bars, propeller shafts and belleville springs.

Stress peening can be used as a means for further reducing the size of parts that are being conventionally peened. In cases where shot peening is not being applied to production parts, a very substantial reduction in size could be accomplished by stress peening.

An example of the increase in fatigue strength by stress peening is illustrated by a comparison of the fatigue life of specimens shown in table I. The material was SAE 9260 steel, quenched and drawn to 40 to 45 Rc. The surface on the tension side where failure occurred was as-rolled, for the purpose of simulating many production parts. These tests were run in simple bending on a Krouse fatigue machine. It will be observed in the fatigue data in table I that there is a wide spread in life in some cases for presumably the same conditions. This is probably the result of the as-rolled condition in which surface imperfections can be expected. These imperfections would be expected to produce a wider spread in



• Fig. 2—Fatigue specimen reported in table I.

TABLE I

Specimens Wheelapeened at 0.014 A-2 Arc Height*
Test Stress 0 to 137,000 Psi

	Cycles to Failure		Number of Specimens
	Minimum of Group	Average of Group	
Not Peened	27,000	53,000	9
Peened Conventionally	95,000	162,000	9
Stress Peened, Static Stress, 137,000 Psi	201,000	4,000,000†	10

† Two specimens of this group were run to 10,000,000 cycles without failures.

* Refers to test made on No. 2 Almen Specimen Gage for measuring arc height of Almen test specimens.

TABLE II

Specimens Wheelapeened at 0.014 A-2 Arc Height
Test Stress 0 to 137,000 Psi

	Cycles to Failure		Number of Specimens
	Minimum of Group	Average of Group	
Not Peened	38,000	55,000	10
Peened Conventionally	131,000	1,132,000	9
Stress Peened, Static Stress, 137,000 Psi	923,000	7,264,000†	8

† Five specimens of this group were run to 10,000,000 cycles without failure.

tests approaching the endurance limit stress for indefinite life. All tests were run in simple bending, that is, from substantially zero to a maximum stress during each cycle.

Table I is a brief summary of one of the earlier series of fatigue tests on laboratory specimens shown in fig. 2.

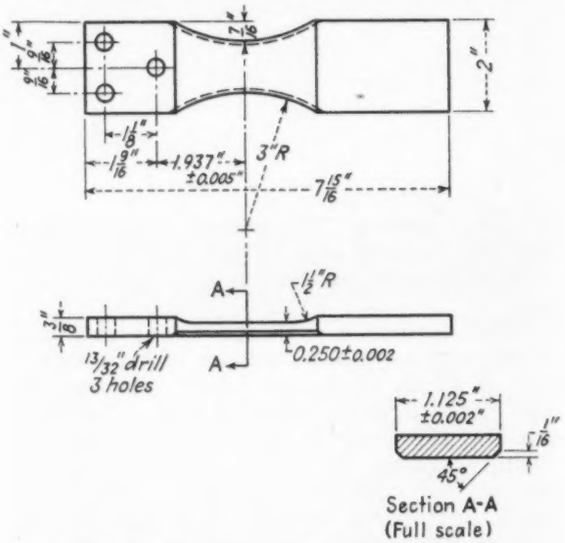
In these tests the stress peened specimens were subjected to the same peening conditions as those specimens peened conventionally, except for the applied stress during peening. That is, the peening was done with P-23 chilled iron shot at 1775 rpm using a 15 in. diam wheel; a conveyer speed of 12 fpm; and a shot flow rate of 150 lb per min. This produced an arc height of 0.014, A-2 on the standard Almen gage.[1]

From these data it will be seen that with conventional peening the average life of these specimens was increased better than 300 pct at a stress that resulted in a very short life on non-peened specimens. With conventional peening all specimens showed a finite life. A comparison of life shows a marked increase for stress peened specimens, but this comparison is somewhat indeterminate because of the fact that some of the stress peened specimens appear to have indefinite life. A comparison of the minimum life of the specimens in table I shows an increase of 350 pct for the conventionally peened group and almost 750 pct for the stress peened group. An examination of the stress peened specimens that failed suggested that the failure started 1/64 to 3/64 in. below the surface.

A second series of tests was made on specimens that had been chamfered on the edges as shown in fig. 3, which would be more representative of actual machine parts. It should be mentioned that the chamfered specimen shown in fig. 3 was adopted for all subsequent fatigue testing. The results of this second series of tests are shown in table II. The peening conditions were the same as used in the tests reported in table I.

The minimum life of stress peened specimens in table II was more than seven times as great as that for the conventionally peened specimens. The average life of the conventionally peened group was very strongly influenced by one specimen that failed at an exceptionally long life of 8,700,000 cycles, compared with the other specimens of that group. The next longest life was 257,000 cycles, or less than one-third of the shortest life obtained in the stress peened group. Subsequent testing under the same conditions has indicated that the average life of identical specimens conventionally peened is on the order of 275,000 cycles. The static stress used in stress peening the specimens reported in tables I and II was the same as the applied stress in the fatigue tests, namely, 137,000 psi.

Table III represents tests in which the peening was done at a reduced wheel speed, thus resulting in a reduced arc height of 0.010, A2. Other investigations on the same type of specimens have indicated that for conventional peening, 0.014, A-2 is the optimum for this thickness.



• Fig. 3—Fatigue specimen reported in tables II, III, IV and V.

The minimum life of the stress peened group was exceptionally short as compared to the others of that group, which would suggest that there may have been an invisible defect in the steel. The only other failure in this group occurred at 739,000 cycles, which is considerably greater than the maximum life of the conventionally peened group (484,000 cycles).

Additional tests have been run with a materially decreased static stress during stress peening with similar results. The lowest static stress used to date is 90,000 psi. Inasmuch as the specimens peened while subjected to this stress indicate an endurance limit stress substantially the same as those with a greater static stress during peening, it is reasonable to believe that a substantial increase in fatigue strength could be obtained with even lower static stress; but would approach that of conventional peening as the static stress approaches zero.

Another series of tests was made at an applied

TABLE III

Specimens Wheelapeened at 0.010 A-2 Arc Height
Test Stress 0 to 137,000 Psi

	Cycles to Failure		Number of Specimens
	Minimum of Group	Average of Group	
Peened Conventionally	151,000	256,000	10
Stress Peened, Static Stress, 137,000 Psi	137,000*	7,600,000†	8

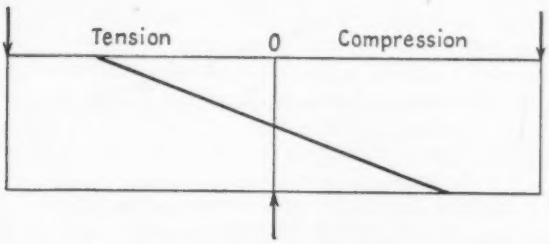
† Six specimens of this group were run to 10,000,000 cycles without failure.
*Next lowest life 739,000 cycles

stress of 157,000 psi. In this case, the stress peened specimens were subjected to a static stress of 137,000 psi during peening. The results are shown in table IV.

It should be mentioned that only one stress peened specimen indicated in table IV had a shorter life than the maximum life of conventionally peened specimens. Stress peening should be distinguished from the process commonly known as presetting, scragging, or bulldozing. Presetting consists of loading a machine part in the same direction as the applied service load to a sufficient stress to exceed the yield stress thereby causing permanent deformation or *set*. When the external load is released, the surface fibers in which the yield stress was exceeded (in torsion or bending) will be in a state of stress in the opposite sense to that applied on those particular fibers during the presetting operation.

It has been found[3] that presetting after shot peening is more effective in increasing fatigue strength than presetting alone or presetting followed by shot peening. Although the increase in fatigue strength by shot peening can be augmented by presetting, the results do not approach those obtained by stress peening.

In order to investigate the relative fatigue strength in a stress peened part in comparison with one which has been shot peened and preset, a group of test specimens, identical to those



• Fig. 4—Distribution of stress in a beam with external bending load only.

shown in fig 3, was tested after having been shot peened and preset. The results of this comparison are shown in table V. The data of table II are repeated in table V for ease of comparison.

The first row of preset figures in table V shows the results of tests on specimens which, after peening, had been preset to the extent that the permanent deformation was ⅛ in. at a distance of 11 7/64 in. from the critical section. The second row of figures of table V shows the results of one test in which an excessive preset of ¼ in. was accidentally obtained, at the same distance from the critical section. The presetting was performed on the fixture shown in fig. 1.

It will be observed by comparing the results of presetting with those of stress peening in table V that a substantial improvement in fatigue strength can be obtained by presetting after peening, but even these results do not approach those obtained by stress peening. It appears that another advantage in stress peening lies in the fact that the magnitude of the static stress during the peening operation is not a critical factor, whereas in a presetting operation the applied load in presetting must be carefully controlled.

TABLE IV

Specimens Wheelapeened at 0.014 A-2 Arc Height
Test Stress 0 to 157,000 Psi

	Cycles to Failure		Number of Specimens
	Minimum of Group	Average of Group	
Not Peened	23,000	25,000	2
Peened Conventionally	94,000	117,000	10
Stress Peened, Static Stress, 137,000 Psi	116,000*	4,200,000	9

* One specimen in this group failed at 73,000 cycles but showed a very deep pit at the origin of failure, and, therefore, the specimen was considered defective.

It has been known that shot peening, when properly applied, greatly increases the fatigue strength of machine parts provided the impact of the shot is not excessive for the particular cross-section involved. It has also been known that *over-peening*, or peening to an excessive degree of impact, can be responsible in extreme cases for an actual decrease in fatigue strength. Further, in cases where such excessive peening occurs, the failure is subsurface because of the excessive tension stresses that necessarily exist in order to balance the forces within the part.

To illustrate this, fig. 4 represents the stress distribution in an externally loaded beam, assuming no residual stresses in the beam, according to the conventional formula. Fig. 5 represents the residual stress in a similar beam that was shot peened on the upper surface; no external load. It should be mentioned that fig. 5 is shown for the purpose of illustration, and the depth of the compressively stressed layer at the peened surface is greatly exaggerated for that purpose. Actually in conventional peening the depth of this layer is relatively shallow in relation to the thickness of the part.

Since such a beam is in equilibrium with no external forces, the shape of the residual stress curve must be such that the forces resulting from tension stresses are equal to those resulting

TABLE V

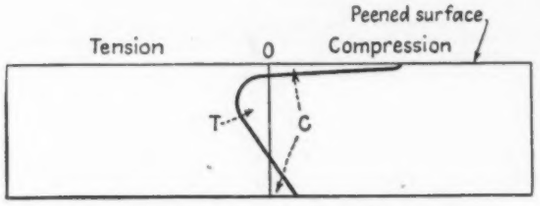
Specimens Wheelapeened to 0.014 A-2 Arc Height
Test Stress 0 to 137,000 Psi

	Cycles to Failure		Number of Specimens
	Minimum of Group	Average of Group	
Not Peened	38,000	55,000	10
Peened Conventionally	131,000	1,123,000	9
Preset, ⅛ in. Set	232,000	2,255,000*	9
Preset, ¼ in. Set	70,000	70,000	1
Stress Peened, Static Stress, 137,000 Psi	923,000	7,264,000†	8

* One of this group ran to 10,000,000 cycles without failure.
† Five of this group ran to 10,000,000 cycles without failure.

from compressive stresses. In other words, the area T in fig. 5 must be equal to the areas C. Further, the summation of the moments of forces represented by these areas must be equal to zero.

When a bending moment is applied to the beam of fig. 5, the resultant stresses at any depth will be the algebraic sum of the bending stress in fig. 4 and the residual stress of fig. 5, as shown in fig. 6 (solid line). The dotted lines of fig. 6 show the individual stresses of figs. 4 and 5.



• Fig. 5—Distribution of stress in a shot peened beam with no external load.

Almen [3] has stated that the surfaces of repeatedly stressed specimens are much more vulnerable to fatigue than the deeper layers.

It can be seen from fig. 6 that the resultant tension stress at the surface is materially reduced by the residual stresses caused by peening, and, therefore, a substantial increase in fatigue strength would be expected. However, if the part is peened to an excessive degree, in relation to its thickness, the area of the compressive stress curve adjacent to the peened surface increases, thereby increasing the tension stresses in the region T. Thus, as peening becomes excessive, the resultant tension stress below the surface becomes greater until, in extreme cases, it may exceed the maximum stress caused by external load, even considering the surface vulnerability.

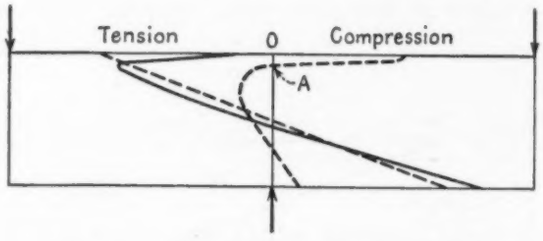
Referring again to fig. 6, it will be noted that even in the residual stress curve, which has been exaggerated for the purpose of illustration, the residual compressive stress is rapidly decreasing with depth, crossing over into the tension stress region at point A. For convenience, the point A has been referred to as the *crossing point.*

Since the resultant stress is the algebraic sum of the residual and bending moment stresses, the resultant stress at the depth of the crossing point is equal to the bending stress at that depth. Beyond that depth, the residual stress is additive to the bending stress, and it is expected that the maximum resultant tension stress is somewhat deeper than the crossing point. If this crossing point could be placed at a greater depth, then the two stresses (residual and bending moment) would become additive at a greater depth, where the bending stress is smaller. However, if, at that point, the rate of increase in residual tension stress is excessive, the maximum resultant tension stress may still be relatively high.

With conventional peening, increased impact of the blast tends to increase the depth of the crossing point, but it also tends to produce a more rapidly increasing residual tension stress in the region adjacent to the crossing point. The final effect may be an actual increase in the maximum resultant tension stress, as evidenced by overpeening that, when carried to extremes, can actually reduce the fatigue strength.

Stress peening, on the other hand, increases the depth of the crossing point and produces a more moderately increasing tension stress in the region adjacent to the crossing point. This is accomplished by the release of the external bending moment after peening, which is equivalent to adding a bending stress in the opposite direction. Since this bending stress adds compressive stresses, increasing linearly from the center of the beam toward the peened surface, the result is a definite increase in the depth of the crossing point, as well as a more gradual increase in the residual tension stress adjacent to the crossing point.

The fact that those stress peened specimens that did fail indicated subsurface failures supports the theory that the maximum stress is placed at a greater depth by stress peening.



• Fig. 6—Resultant distribution of stress in a shot peened beam with external load applied. (Solid line is the resultant.)

These sub-surface failures are contrasted to those resulting from overpeening in that the life of the stress peened specimens was so much greater than that of conventionally peened specimens, that it indicates a distinctly different character of residual stresses.

As the test results appear to agree with this theory, it has been concluded that the superior results obtained by stress peening are due to the increased depth of the crossing point and a more desirable slope of the residual stress curve adjacent to that point. The results obtained to date on stress peening indicate that the potentialities of shot peening are much greater than has been realized.

Acknowledgment

The authors express their appreciation to C. R. Cline, assistant to the president, American Wheelabrator & Equipment Corp., for his assistance and helpful suggestions in the preparation of this article.

[1] *"Shot Peening," American Wheelabrator & Equipment Corp.,* 1947.

[2] *"Report on the Effect of Shot Blasting on the Mechanical Properties of Steel," by R. L. Mattson and J. O. Almen, Part II, p. 23, War Metallurgy Div., of the National Defense Research Committee of the OSRD.*

[3] *"Improving Fatigue Strength of Machine Parts," by J. O. Almen,* THE IRON AGE, *June* 10, 1943, *p.* 65.

Foundrymen to Meet in St. Louis

W. B. WALLIS, Pittsburgh Lectromelt Furnace Corp., AFS president who will preside at the convention.

EXTENSIVE discussion of the latest foundry developments, including a symposium on nodular graphite irons, will feature the 53rd annual convention of the American Foundrymen's Society to be held in St. Louis, May 2 to 5.

Technical sessions planned for the meeting include seven on gray iron, four on aluminum and magnesium, four each on brass, bronze, malleable and steel and two each on education and patterns. A feature of earlier conventions that will be reinstituted this year will be a safety and hygiene session.

The annual banquet will include an address by W. Stuart Symington, secretary for air, and the awarding of AFS medals for outstanding achievement in the foundry industry. This year's Peter L. Simpson Memorial medal will be awarded to R. J. Anderson, works manager, Belle City Malleable Iron Co., Racine, Wis. The J. H. Whiting Gold Medal will be awarded to S. C. Massari, AFS technical director, and Gosta Vennerholm, metallurgist, Ford Motor Co., Dearborn, Mich., will receive the Wm. H. McFadden Medal.

Other highlights of the meeting will be the engineering school graduates luncheon, the educational dinner, the Canadian dinner, and the AFS alumni dinner.

The Charles Edgar Hoyt Annual Lecture will again be presented following the business meeting.

This year there will be no equipment exhibit in connection with the convention; this exhibit is held every second year. Headquarters for the AFS during the convention will be the Jefferson Hotel.

Technical Program of AFS Annual Convention

MONDAY, MAY 2

10.00 A.M.

Aluminum and Magnesium

"Metallography of Aluminum Casting Alloys"—A. M. Montgomery, Aluminum Co. of America, Cleveland.

"Metallography of Cast Magnesium Alloys"—P. F. George, Dow Chemical Co., Midland, Mich.

Brass and Bronze

"Casting Finish"—H. H. Fairfield and J. MacConachie, Wm. Kennedy & Sons, Ltd., Owen Sound, Ont., Canada.

"Effects of Melting Atmosphere, Time at Temperature and Degasification on Properties of Valve Bronze"—W. H. Baer and B. M. Loring, Naval Research Laboratories, Washington.

"Practical Melting and Its Relation to Gases in Metal"—O. E. Decker, Acheson Mfg. Co., Pittsburgh.

Malleable

"Effects of Temperature and Silicon Content on First Stage Annealing of Blackheart Malleable Iron"—J. E. Rehder, Canadian Bureau of Mines, Ottawa.

"Surface Hardening of Pearlitic Malleable Iron"—Progress Report, Malleable Research Project—S. H. Bush, W. P. Wood and F. B. Rote, University of Michigan.

12:00 Noon

Aluminum and Magnesium Round Table Luncheon

"Fluid Flow in Transparent Molds"—Progress Report and Motion Picture, Aluminum and Magnesium Research Project—R. E. Swift, J. H. Jackson and L. W. Eastwood, Battelle Memorial Institute, Columbus, Ohio.

2:00 P.M.

Brass and Bronze

"Gas Fired Melting of Copper Base Alloys in a Reducing Atmosphere" —D. O. Caudron, Pacific Brass Foundry, San Francisco.

"The Problem of Gases in the Indirect Arc Furnace"—M. G. Dietl, Crane Co., Chicago.

Malleable

"Influence of Type of Slag on Heat Treatment Susceptibility of Malleable Iron"—G. A. Vennerholm and H. N. Bogart, Ford Motor Co., Dearborn, Mich.

"Influence of Heating Rate on First Stage Graphitization of White Cast Iron"—R. Schneidewind, University of Michigan, and D. J. Reese, International Nickel Co., New York.

4:00 P.M.

Malleable

"Some Effects of Deoxidation Treatments on Graphitization of White Cast Iron"—R. W. Heine, University of Wisconsin, Madison.

"Influence of Silicon Content on Critical Temperature Range During Slow Cooling of Blackheart Malleable Iron"—J. E. Rehder, Canadian Bureau of Mines, Ottawa.

Brass and Bronze

"Graphite Resistor Furnace Melting Practice"—B. N. Ames and N. A. Kahn, New York Naval Shipyard, Brooklyn.

"Mel Quality and Fracture Characteristics of 85-5-5-5 Red Brass"—Brass and Bronze Research Progress Report—J. P. Ewing, C. Upthegrove, and F. B. Rote, University of Michigan.

6:30 P.M.

Educational Dinner

"How to Interest Our Youth in The Foundry Industry"—Discussion by E. E. Greene, Indianapolis Public Schools, representing schools, and F. B. Skeates, Link-Belt Co., Chicago, representing industry.

8:00 P.M.

Gray Iron Shop Course

Subject — *"Carbon Trends in Gray Iron."*

Discussion Leader — W. W. Levi, Lynchburg Foundry Co., Radford, Va.

Sand Shop Course

Subject—*"Causes of Penetration in Steel Castings."*

Discussion Leader — E. E. Woodliff, Foundry Sand Service Engineering Co., Detroit.

TUESDAY, MAY 3

10:00 A.M.

Heat Transfer

"Comparative Solidification Studies" —Progress Report, Heat Transfer Research, V. Paschkis, Columbia University.

"The Foundryman and Heat Transfer"—V. Paschkis, Columbia University.

Malleable

"Controlled Atmosphere Annealing of Malleable Iron" — Committee Report, R. P. Schauss, Illinois Clay Products Co., Chicago.

"Maintenance in a Mechanized Foundry"—C. T. Luther, Central Foundry Div., G.M.C., Saginaw Malleable Foundry, Saginaw, Mich.

Aluminum and Magnesium

"Designing Magnesium Castings for Aircraft Engines"—M. H. Young and A. G. Slachta, Wright Aeronautical Co., Wood Ridge, N. J.

"Design of Light Metal Castings"—G. H. Found, Dow Chemical Co., Midland, Mich.

Brass and Bronze

"Effect of Composition on Properties and Structure of Cast Monel"—J. T. Eash, International Nickel Co., Bayonne, N. J.

"Recent Developments in Theory and Practice of Insulating Sleeves, Pads, and Risers for Non-Ferrous Casting" — K. A. Miericke, U. S. Gypsum Co., Chicago.

12:00 Noon

Brass and Bronze Round Table Luncheon

Subject—*"Some Practical Applications of the Fundamental Principles of Melting, Pouring and Casting of Tin Bronzes."*

Discussion Leaders—Melting—H. M. St. John, Crane Co., Chicago. Pouring—L. W. Eastwood, Battelle Memorial Institute, Columbus. Gates and Risers—G. Bradshaw, Philadelphia Naval Shipyard.

Malleable Round Table Luncheon

Subject—*"Reduction of Losses Due to Cracks or Tears."*

Discussion Leaders—R. J. Anderson, Belle City Malleable Iron Co., Racine, Wis., and K. H. Hamblin, Grinnell Co., Providence.

Subject—*"Improved Malleable Melting Refractories"*

Discussion Leaders — M. J. Henley, Texas Foundries, Inc., Lufkin, and F. Czapski, Chicago Malleable Castings Co., Chicago.

2:00 P.M.

Time Study and Methods

"Developing Standard Data Tables for a Four-Man Molding Unit"—M. T. Sell, Sterling Foundry Co., Wellington, Ohio.

Sand

"Plastic Binders for Foundry Sand Practice"—H. K. Salzberg, Borden Co., Chemical Div., Bainbridge, N. Y.

"Elevated Temperature Properties of Steel Molding Sands" — Progress Report, Research Project—P. E. Kyle, Cornell University.

"Causes of Rat-Tail Defects"—Committee Report, H. W. Dietert, Harry W. Dietert Co., Detroit.

Aluminum and Magnesium

"Correlation of Cooling Curve Data with Casting Characteristics of Aluminum Alloys"—E. E. Stonebrook and W. E. Sicha, Aluminum Co. of America, Cleveland.

"Fluxing of Aluminum Alloys"—Committee Report, H. Brown, Solar Aircraft Co., Des Moines.

"Grain Refining of Aluminum Alloys and Its Effect on Physical Properties"—W. Bonsack and O. Tichy, Apex Smelting Co., Cleveland.

Patterns

"Information Needed to Produce Satisfactory Pattern Equipment" — R. G. Christensen, Racine Pattern Works, Racine, Wis.

"Maintenance of Wood and Metal Patterns" — A. Huebner, Allis-Chalmers Mfg. Co., Milwaukee.

4:00 P.M.

Foundry Costs

"Approach to Standard Costs in the Foundry" — F. Ruffalo, Westover Engineers, Milwaukee.

Question and Answer Period — Cost Problems of General Interest, Method of Cost Accounting, Distribution of Costs, etc.

Refractories

Panel Discussion—*"Your Refractory Problems—What are They?"*

Joint Session, Gray Iron and Malleable

Symposium—*"Production of Nodular Graphite Gray Iron."*

"Spheroidal Carbon Cast Iron"—D. J. Reese, International Nickel Co., New York.

Discussion by — G. A. Vennerholm, Ford Motor Co., Dearborn, Mich.; R. G. McElwee, Vanadium Corp. of America, Detroit; C. K. Donoho, American Cast Iron Pipe Co., Birmingham, Ala.

8:00 P.M.

Plant and Plant Equipment

"Modern Foundry Core and Mold Ovens"—C. A. Barnett, Foundry Equipment Co., Cleveland.

Gray Iron Shop Course

Subject — *"Inexpensive Tests for Small Gray Iron Foundries."*

Discussion Leader—W. Bohn, Buick Motor Div., G.M.C., Flint, Mich.

Sand Shop Course

Subject—*"Resin Sand Cores vs. Oil Sand Cores."*

Discussion Leader — T. W. Curry, Lynchburg Foundry Co., Lynchburg, Va.

WEDNESDAY, MAY 4

10:00 A.M.

Gray Iron

"Effect of Boron on Structure and Some Properties of Plain Cast Irons" — A. I. Krynitsky and H. Stern, National Bureau of Standards, Washington.

"Blast Humidity as a Factor in Cupola Operations" — D. E. Krause, Gray Iron Research Institute, Inc., and H. W. Lownie, Jr., Battelle Memorial Institute.

Sands

"pH of Foundry Sands" — B. H. Booth, Carpenter Bros., Inc., Milwaukee.

"Causes of Scab Defect"—Committee Progress Report — G. F. Watson, American Brake Shoe Co., Mahwah, N. J.

Steel

"A New Method for Determining Austenitic Grain Size of Cast Steel" —E. J. Eckel, University of Illinois, and S. J. Paprocki, Battelle Memorial Institute.

"Note on As-Cast Structure and Grain Size in Cast Alloy Steels"—E. A. Loria, Mellon Institute of Industrial Research.

"Prevention of Hot Tears in Thick-Walled Centrifugally Cast Steel Tubes"—J. F. Wallace and J. L. Martin, Watertown Arsenal.

12:00 Noon

Pattern Round Table Luncheon

"Shall Pattern Equipment be Machined or Cast to Size?"—V. C. Reid, Jr., City Pattern, Foundry & Machine Co., Detroit.

Engineering School Graduates Luncheon

Presiding—C. J. Freund, University of Detroit.

2:00 P.M.

Annual Business Meeting

Presiding—W. B. Wallis, President, American Foundrymen's Society.

President's Annual Address.

Apprentice Contest Awards.

Election of Officers and Directors.

2:45 P.M.

Charles Edgar Hoyt Lecture

"Steel Castings in Welded Assemblies"—John Howe Hall, Consultant, Swarthmore, Pa.

4:00 P.M.

Gray Iron

"Graphitizing Behavior of White Cast Iron" — S. C. Massari, American Foundrymen's Society.

Progress Report, Cupola Research —R. G. McElwee, Vanadium Corp. of America, Detroit.

"The Properties of Cast Iron in Relation to the Carbon Equivalent Value"—Institute of British Foundrymen Exchange Paper — H. T. Angus, F. Dunn and D. Marles, British Cast Iron Research Ass'n.

8:00 P.M.

Gray Iron Shop Course

Subject—*"Sources of Metal Losses in the Foundry."*

Panel Discussion—A. Barczak, Superior Foundry Co., Cleveland, and N. L. Peukert, Carondelet Foundry Co., St. Louis.

Sand Shop Course

Subject—*"Core Sand Blowing Practices."*

Discussion Leader — H. Schutzenhoffer, Key Co., East St. Louis, Ill.

Gray Iron and Steel

Colored Motion Pictures — *"Finger Gating"* and *"Step Gating"*—W. H. Johnson and W. O. Baker, Naval Research Laboratories, Washington.

THURSDAY, MAY 5

10:00 A.M.

Gray Iron

"High Silicon Cast Iron Resists Growth and Scaling"—W. H. White, Jackson Iron & Steel Co., Jackson, Ohio, and A. R. Elsea, Battelle Memorial Institute.

"Graphitization of Gray Cast Iron by Heat Treatment" — Institute of Australian Foundrymen Exchange Paper—A. W. Silvester, Russell Mfg. Co. Pty., Ltd., Melbourne, Australia.

Steel

"Rapid Analysis of Acid Slags"—E. C. Zuppann, Wilson Foundry & Machine Co., Pontiac, Mich., and A. E. Martin, University of Minnesota.

"A Study of Insulating and Mildly Exothermic Antipiping Compounds Used for Steel Castings" — S. L. Gertsman, Canadian Bureau of Mines, Ottawa.

Safety and Hygiene

"Attracting and Keeping Good Men in the Foundry" — G. E. Tubich, Michigan Department of Health, Grand Rapids.

"Industrial Hygiene in the Foundry" —H. J. Weber, American Brake Shoe Co., Chicago.

12:00 Noon

Gray Iron Round Table Luncheon

Subject—*"Gating and Risering."*

Discussion Leaders — H. F. Taylor, Massachusetts Institute of Technology and N. A. Birch, American Brake Shoe Co., Mahwah, N. J.

Steel Round Table Luncheon

Subject—*"Sand Testing and Its Relation to Casting Defects."*

4:00 P.M.

Steel

"Effect of Various Deoxidizers on the Structure of Sulphide Inclusions" —C. E. Sims, H. A. Saller, and F. W. Boulger, Battelle Memorial Institute.

"Effect of Aluminum and Vanadium on the Toughness of High Hardenability Cast Steel"—J. F. Wallace, Watertown Arsenal, Mass.

Gray Iron

"Production and Consumption of Heat in the Cupola"—D. W. Gunther, National Radiator Co., Johnstown, Pa.

"Design and Operation of a 10-Inch Cupola"—D. E. Krause, Gray Iron Research Institute, and H. W. Lownie, Jr., Battelle Memorial Institute.

7:00 P.M.

Annual Banquet

Awarding of Medals

Principal Speaker: W. Stuart Symington, Secretary for Air.

A Practical Method for Determining

Heat Abstraction

By T. T. RICK

Metallurgist,
Allis-Chalmers Mfg. Co.,
Milwaukee

FOUNDRYMEN are occasionally confronted with the question of how fast various molding materials will chill a given cast metal. Since molding materials are usually complex mixtures, data available in literature on relatively pure substances are difficult to apply. It is conceivable that the heat abstracting capacity of silica sand, for instance, would be different if the sand particles were bonded by an oxidized film of core oil, a hydrolized film of clay, or hydrated Portland cement. In the first example, water is not involved, while in the last two cases steam is evolved when molten metal contacts the mold.

The solution of this problem in the temperature range of molten cast iron, when based on calculations involving the specific heat of the sand, its thermal conductivity, and such complicating factors as the heat of decomposition of core oil and the heat of vaporization of water, becomes tedious if not questionable.

This article describes a practical test, to replace estimates, that has been devised to give a relative measure of the heat abstracting properties of various molding materials as used in actual foundry practice.

This test consists of pouring a weighed amount (5230 g) of molten cast iron at 2560°F into a cup mold of fixed dimensions (see fig.1), made of any of various molding materials. In making the test at Allis-Chalmers the cast iron was melted in an induction furnace and the temperature of the metal was measured with an optical pyrometer before pouring. When the desired temperature of 2560°F was reached, the metal was poured directly from the furnace crucible into the cup mold in approximately 10 sec. With the pouring completed, the cup mold was immediately covered with an insulating brick 2½-in. thick.

A time clock was started at the beginning of pouring. Temperature readings of the cast metal and the mold were taken at 1 min intervals for a period of 30 min. At this point the mold approached a constant temperature. The apparent density of the cup mold was obtained by weighing the mold before pouring and applying the necessary calculations. Weighing of the iron of different heats before melting and after pouring showed a metal loss ranging between 0.8 and 2 pct of the original charge.

The cup mold used in the tests, shown in fig. 1, was formed by hand ramming moist molding materials. Green sand molds were tested short-

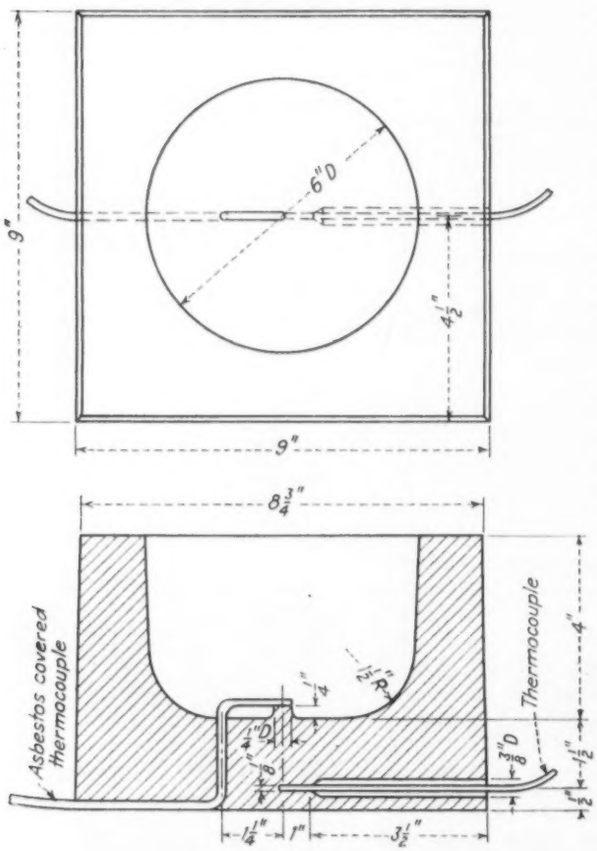


FIG. 1—Dimensions of cup mold used to determine rate of heat abstraction by various molding materials.

By Molding Materials

A simple, practical method for determining the relative rate of heat abstraction by various molding materials, using a standard cup mold in which two thermocouples are embedded is described by the author. Results of the use of this test on 8 molding sand mixes and cast iron are discussed.

ly after ramming, while oil core sand molds were baked according to usual foundry practice. This cup mold, if used without a flask backing, will crack and allow the molten metal to run out. To overcome this difficulty the cup mold was placed in a steel flask. The annular space (1 in.) between the jacket and mold was filled with dry molding sand. The whole assembly rested on a ¾-in. sheet of Transite asbestos board.

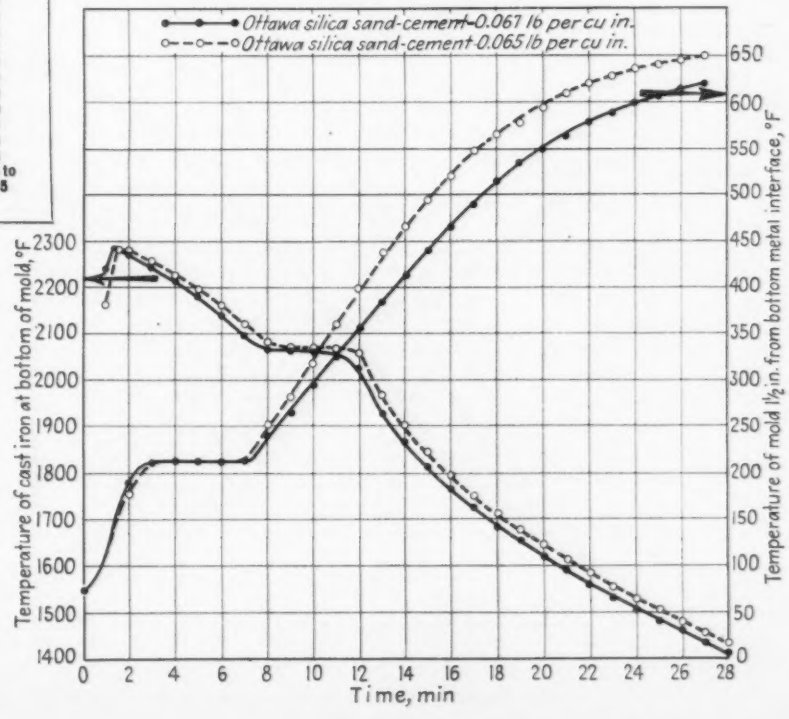
TABLE I

Screen Analysis, pct	Mix No. 1 Ottawa Silica Sand	Mix No. 2 Loam Sand	Mix No. 3 Black Core Sand	Mix No. 4 Green Facing Molding Sand
On 6 mesh	....	....	0.2	....
On 12 mesh	....	0.6	0.2	0.2
On 20 mesh	....	5.6	2.2	0.6
On 30 mesh	....	15.2	5.4	0.8
On 40 mesh	1.4	20.6	11.2	2.0
On 50 mesh	24.8	16.2	19.6	16.0
On 70 mesh	40.4	11.4	14.8	21.0
On 100 mesh	25.6	5.6	13.4	20.2
On 140 mesh	6.4	2.6	10.2	17.6
On 200 mesh	1.0	0.8	3.6	4.0
On 270 mesh	0.2	1.6	1.2	1.0
On pan mesh	0.2	6.0	5.4	2.0
Total grain	....	86.2	87.4	85.4
AFA Clay	....	13.8	12.6	14.6
Fineness No.	57.1	58.9	72.2	73.8
Apparent density, lb per cu in.	0.0655 to 0.0671	0.0657 to 0.0670	0.0638	0.0495 to 0.0535

The temperature of the cast metal was measured by an 18-gage asbestos covered Chromelalumel thermocouple imbedded vertically 1¼ in. off the centerline of the circular cup (see fig. 1). The couple bead was covered with a woven asbestos sock to prevent direct metal-to-metal contact between the hot junction of the thermocouple and the molten cast iron. If the asbestos covering is not impervious to the molten metal the thermocouple will melt away and fail. The projecting couple was bent 90° so the bead of the couple touched the raised boss at the center of the mold bottom. It is important that in each cast the thermocouple be located at the same distance from the mold bottom to assure reproducible temperature readings between heats.

The mold temperature was measured at an accurately positioned hole 1½ in. below the mold bottom. An 18-gage Chromel-alumel thermocouple was used with the bead at the center line of the mold. A 2½-in. thick insulating brick cover was placed over the cup mold immediately after pouring to decrease the radiation losses

FIG. 2—Cooling curves of cast iron in cup molds of various materials illustrating reproducibility of results.



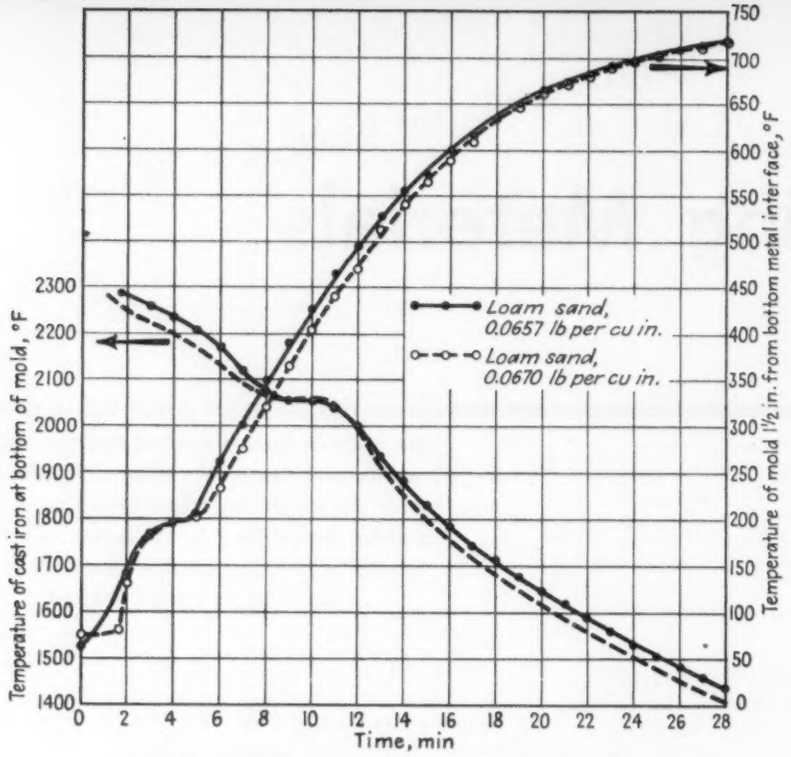


FIG. 3—Cooling curves for cast iron in loam sand.

obtained with an open top. The test loses sensitivity in differentiating the heat abstracting properties of different materials if the insulating cover is not used.

Molding materials tested included (1) Ottawa silica sand; (2) loam sand; (3) black core sand; (4) green facing sand; (5) proprietary firebrick grog mixture; (6) proprietary refractory furnace cement; (7) Ottawa silica sand and oil; (8) oil core sand and (9) cast iron.

The Ottawa silica sand mixture consisted of 80 pct sand, 11 pct Portland cement and 9 pct water. The screen analysis of this sand is given in table I. Molds made of this mixture were set and air dried three days before testing.

Mixture No. 2, table I, was made up of 94 pct loam sand and 6 pct water. This is a natural sand containing the required amount of clay for bonding purposes. After air drying for several days, the mold was baked at 500°F for 2 hr before testing.

The black core sand mix tested (No. 3, table I), was a mix of silica sands containing clay and pitch as a binder. The mold was air dried 10 days and baked at 450°F before testing for rate of heat abstraction.

Mix No. 4 (table I), green facing molding sand, is a natural sand containing the necessary clay bond and 5 to 7 pct sea coal. The moisture content was approximately 5 to 6 pct when mixed. Since there was a time lapse of approximately 1 hr between making the cup mold and pouring the metal, the final moisture content may have been somewhat less.

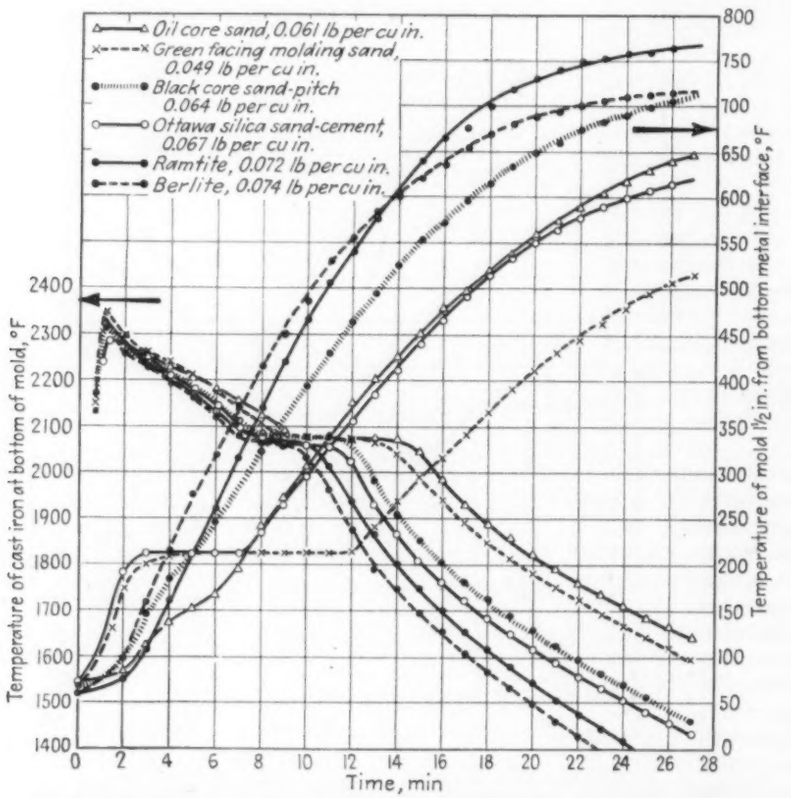


FIG. 4—Cooling curves for cast iron in cup molds of various molding materials.

Mixtures Nos. 5 and 6 are refractory materials rather than molding materials in the commonly accepted sense of the word, but have been included in the tests because they can be used as local chills and because, due to their high density as compared with regular molding sands, they provided a ready means of extending the range of data taken in the tests.

Mixture No. 5 was a proprietary firebrick grog mixture supplied by the manufacturer in mud form. After air drying the mold for 7 days it was fired at 2300°F (limit of furnace facilities) for 4 hr. Commercial firebrick is usually fired at approximately 2900°F. The resulting cup mold had an apparent density of 0.072 lb per cu in., equal to the average of

low and high density firebrick.

Mix No. 6 was a proprietary refractory furnace cement. The mold was baked at 500°F 2 hr before testing, and its apparent density was 0.074 lb per cu in.

Mix No. 7 consisted of Ottawa silica sand and oil, proportioned as follows: Ottawa silica sand, 92.6 pct; cereal binder, 0.8 pct; core oil, 0.7 pct, and water, 5.9 pct. The mold was baked at 410°F and had an apparent density of 0.0629 lb per cu in.

Mix No. 8 was an oil core sand, mixed as follows: Bank sand, 92.6 pct; cereal binder, 0.8 pct; core oil, 0.7 pct, and water, 5.9 pct. The molds were baked at 410°F and had an apparent density of 0.0549 to 0.0613 lb per cu in.

Test No. 9 was of cast iron with an apparent density of 0.268 lb per cu in. The cup molds for this test were given one coat of aqueous plumbago blacking on the inside surface.

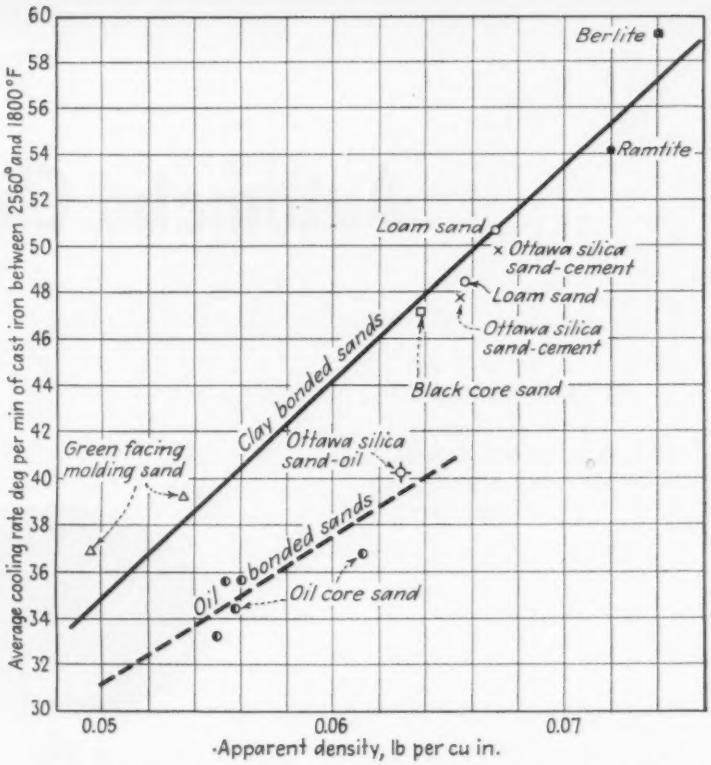


FIG. 5—Relative rate of heat abstraction of various molding materials as related to apparent density.

The results of the tests are shown by the time-temperature cooling and heating curves in figs. 2 to 4. Figs. 2 and 3 are curves showing the reproducibility of results obtainable in separate heats on the same molding material. The difference in the cooling rates may be partially attributed to the difference in the apparent density of the mold. The variation in density in turn can be attributed to the manual methods of ramming the mold.

The time-temperature relationship as represented by the cooling curve of the cast iron at the mold bottom is a relative measure of the heat abstracting properties of the particular mold material being tested. The heating curve of the mold taken 1½ in. from the bottom metal interface gives an indication of the thermal conductivity of the mold material, and provides some explanation of the mechanism of heat transfer when water vapor and organic substances are present.

Fig. 4 shows a group of cooling curves made of different molding materials having a wide range of apparent densities. The quantitative significance of these curves is more apparent if the cooling rate is plotted against apparent density, as in fig. 5. The cooling rates, as plotted, were obtained by dividing the temperature difference between the actual pouring temperature, 2560°F, and 1800°F by the time required for the metal to cool to 1800°F. The 1800°F temperature was arbitrarily selected. The two straight lines, one for clay bonded sands and one for oil bonded sands, indicate, for all practical purposes, that the rate of heat abstraction of the molding material is proportional to the apparent density. The oil bonded sands show a lower heat abstracting capacity than the clay bonded sands. This may be due to the insulating effect of the organic film and carbonaceous residue formed after pouring which separates the sand particles.

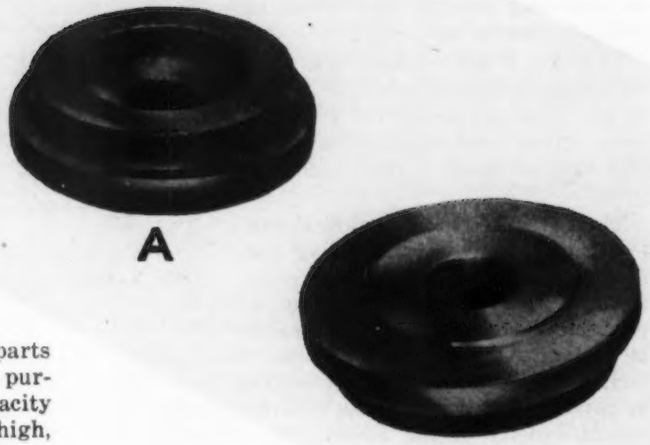
Since metallic and refractory chills are used for chilling local areas in castings to remove hot spots, cup molds were made of cast iron and Ramtite, a firebrick equivalent, to determine their relative heat abstracting properties as compared to regular molding sands. The results show that the relative chilling capacity of the firebrick to green molding sand is 1.5 times greater, while cast iron is 10 times greater.

For practical purposes it is unnecessary for the foundryman to give the actual value of the heat abstracting capacity of a given molding sand mixture. A knowledge of the relative values is all that is necessary. This can be obtained by weighing 1 cu ft of the various molding sands to be compared, all being rammed by the same method. The molding mixtures with the greatest apparent density will have the greatest heat abstracting capacity. This will only apply if the bonding agent such as clay is used for the sands being compared. This will also apply to a comparison of oil bonded sands.

• • •

Automatic Chuckers Feature

By GUS CARLSON
Chief Tool Engineer,
New Britain-Gridley Machine Div.,
New Britain Machine Co.,
New Britain, Conn.



WHILE production runs of machined parts often justify the expense of special purpose machines, when productive capacity of general purpose equipment is sufficiently high, its benefits are far more than just the difference in the prices of the machines. One particular type of high production, general purpose equipment—the automatic chucking machine—is versatile, highly adaptable and capable of production rates comparable to many of the best single purpose machines, and still maintains the flexibility that allows it to be set up on many other jobs.

Besides this high production and versatility, the chucker, in increasing instances, is offering better methods and greater efficiency. These two factors are sought by all production men faced with the problem of facilitating manufacturing processes and widening profit margins. Typical of its profitable application is the story of one company that was getting seven pieces an hr. from a line of eight separate machines with eight operators. Replacement with one eight spindle chucker with one operator immediately jumped production to 104 pieces per hr. The obvious advantages made the investment a necessity.

Another company increased production 600 pct —from 31 to 186 pieces per hr. Another bettered former methods and got an improved part increasing production 350 pct and reducing cost per piece 2.8c. A typewriter manufacturer increased production from 90 to 120 pieces per hr., reduced labor costs by 85 pct on the job, and improved the quality of the part with tolerances held under 0.001 in. A sewing machine manufacturer now does 21 operations on one chucker dropping off a complete piece every 24 sec.

Besides these improvements, the rigidity and power built into modern chucking machines permit the utilization of the high machining feeds and speeds necessary with carbide tools. The machine can be used for both symmetrical and non-symmetrical parts, for the possibilities for false jaws are extensive and the models are built in a range of sizes to handle a great variety of work.

Typical specific examples of better methods on automatic chucking machines are the following two jobs for which the New Britain-Gridley Machine Co., tooled two of its machines. The points of interest of these jobs, aside from the high production rates and the improvement over former methods, are the number of operations on the various pieces, the fact that two faces of a piece can be machined by double indexing, that non-concentric jobs are machined, and that high tool feed and cutting speed rates are possible for the use of carbides.

Fig. 1A shows a cast iron crankshaft or damper pulley that is machined at a rate of 90 per hr. by double indexing on a New Britain-Gridley model 98, 8-spindle automatic chucking machine with flat-type cross slides. These open-ended,

High Production and Efficiency . . .

Automatic chucking is a versatile machining method applicable to a wide variety of work. Tooling is limited only by the imagination of the tool engineer, and many jobs can frequently be done on automatic chuckers at production rates comparable with much of the best single purpose equipment.

work rotating chuckers are built with either flat or swinging type cross slides. This machine has three flat slides mounted on the face plate between spindles Nos. 2 and 3, 4 and 5, and 6 and 7. Tools for the successive positions are mounted on the top and bottom of the appropriate slide.

Therefore, tools mounted on the same slide have the same feed, but the feed can be different for each separate slide. This is apparent in fig. 2 showing the rear of the tooling area. These cross slides are of the flat type, having tools mounted on both top and bottom and serving two spindle operations.

The face shown as fig. 1C is machined in the second, fourth and sixth positions of the machine and the face shown as fig. 1B is machined in the third, fifth and seventh positions. Positions one and eight are used to load, unload and turn the parts over in the one machine.

The spindle speed of this job is constant at 124 rpm, driven through speed change gears by a motor operating at 1160 rpm. The spindle revolves 71 times to complete the longest operation. The 7¼ in. OD is turned at 235 sfpm and the boring of the 4.228 in. diam is at 137 sfpm.

The rough piece is loaded in the eighth station, with the hub end out, and then indexed through two stations into the second position. To eliminate wear between the spindle carrier and the locating pads, the carrier is lifted about

C

FIG. 1—The casting, A, front face machine work, C, and back face machine work of a crankshaft pulley are shown here. Twenty-five operations are performed in an automatic chucker at the rate of 90 pieces an hr. by double indexing the work through the 8 machine station.

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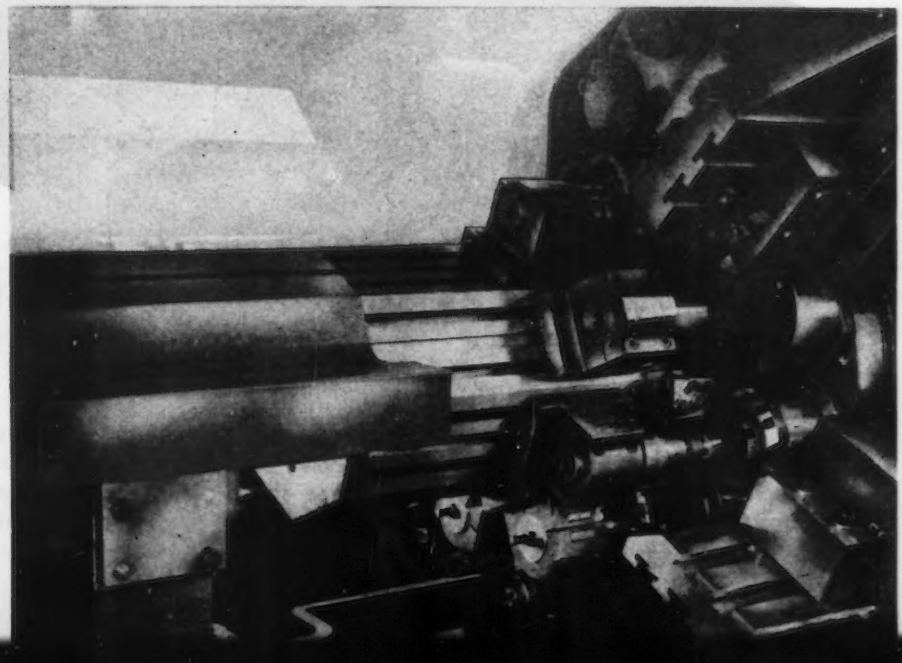
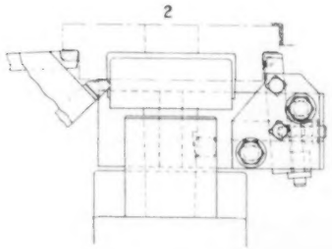
FIG. 2—The cross slides of this automatic chucker serve two machining stations with tools mounted above and under the slide. The tool mounted on the top of the slide can be seen in this photograph and the T slots for tool mounting on the bottom of the slide are visible.



0.015 in. during the indexing phase of the cycle. This is accomplished by a cam that actuates a bronze lifting shoe and raises the carrier during indexing. The carrier is then set back down on the locating pads on the frame and locked for the machining phase of the cycle. This assures correct alignment of the spindles and working tools at all times and guarantees the accuracy of the carrier for the life of the machine.

For the cutting cycle in this second position a 1.5 in., double rise cam on the lower front cross slide gives a feed of 0.0236 in. per revolution for 61 revolutions of the spindle, and a feed of 0.0066 in. per revolution for the next 10 revolutions of the spindle. These double rise cams slow down the feed at the end of the cutting stroke to reduce strain on the slide and to give a better finish on certain portions of the work.

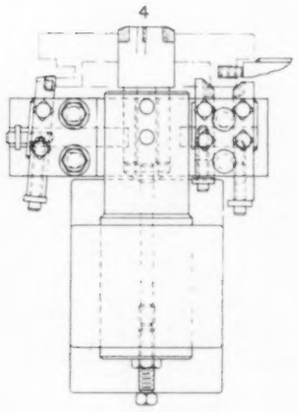
As can be seen in the second position tooling drawing, a boring and facing head roughs the recessed area of the pulley, and one single point



Second Position, Bore, Turn and Face.

tool rough turns the outside diameter of the belt groove. Upon completion of these operations, the part double indexes from the second to the fourth position in the machine.

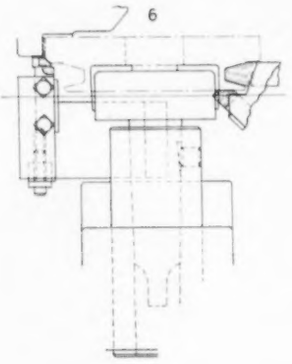
In the fourth position, there is one cross working tool. This rough groove forming tool shown in the tool drawing is fed by a ¾ in. double rise cam with 0.012 in. per revolution advance for the 61 revolutions of the spindle and 0.006



Fourth Position, Groove, Ream, Turn, and Chamfer.

in. per revolution advance for the last 10 revolutions of the spindle. Also in the fourth position, there are a reamer com-in from the end working slide that reams the 1.863 in. diam hole; a turning tool that finish turns the OD of the belt groove, and the two chamfering tools that chamfer the top edges of the flange. These details also are shown in the fourth position sketch. After the tools retract the machine indexes.

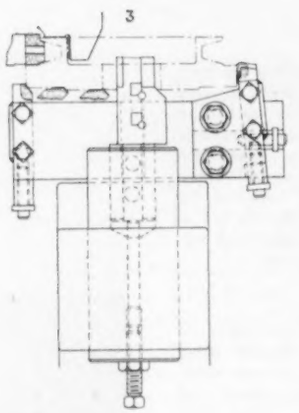
In the sixth position, another boring and facing head finishes the work roughed out in the second position. This boring head is mounted on the main tool slide along with a chamfering tool. Coming from the cross slide is a form tool that semi-finishes the belt groove and a finish facing tool. These tools are fed in from the



Sixth Position, Bore, Face, Form and Chamfer.

sixth and seventh position cross slide by a 1⅜ in. double rise cam with a 0.021 in. per revolution advance for the first 61 revolutions and 0.006 in. for the last 10. Also, a chamfering tool chamfers the flange in this position.

This finishes the operation on the face of the pulley and after the spindle carrier double indexes into the eighth position, the operator removes the piece, turns it over and puts it in the chuck in the first position, from which he has removed a finished piece. He also places a blank in the eighth position chuck. Chucking, unchucking and turning the piece constitutes no lost time, for the other spindles are working while the operator has spindles 1 and 8 stopped for loading. As can be seen in fig. 3, the chucks in the first, third, fifth and seventh positions are of the internal gripping or expanding type, while the

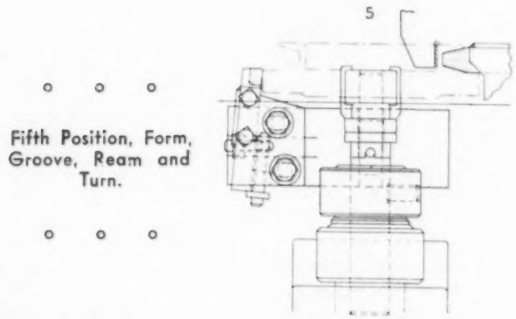


Third Position, Form, Face, Bore, Turn and Chamfer.

second, fourth, sixth and eighth position chucks are of the contracting type.

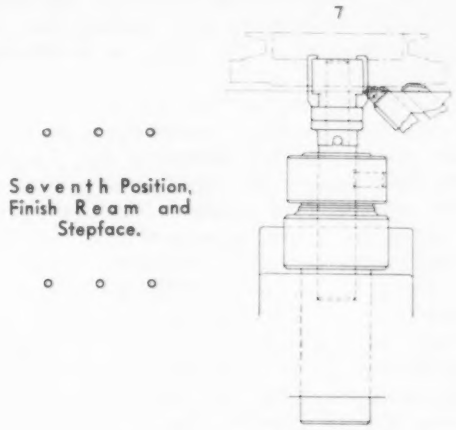
From the first position, the piece indexes to the third position. Here the first machining op-

eration on the reverse side of the part is performed. A radius form and facing tool mounted on the second and third position cross slide, cuts the small radii on either edge of the pulley belt groove and finish faces one side of the flange. On this same slide two rough facing tools are also mounted. These two facing tools rough face the flat side of the piece, shown in fig. 1B at the same feed advance as the second position cross slide tools. The end working tools in this position are a boring tool that bores out the shaft hole to 1.893 in. diam; a chamfering tool; and a turning tool that rough turns the OD of the piece. The part is then indexed.



In the fifth position, a forming tool mounted on the fourth and fifth position cross slide finishes the V belt groove, and a reamer, mounted on the main tool slide, rough reams the shaft hole to 1.918 in. diam. A finish turning tool on the main tool slide finish turns the OD of the piece. It then indexes to the seventh position.

In this last machining position the shaft hole is finish reamed to 1.918 in. diam. Operating from the sixth and seventh position cross slide, two finish facing tools stepface the back of the



piece. The part then indexes into the first position where the operator unloads it as a completely finished piece. A finished piece, both back and front sides, comes off the machine every 40 sec.

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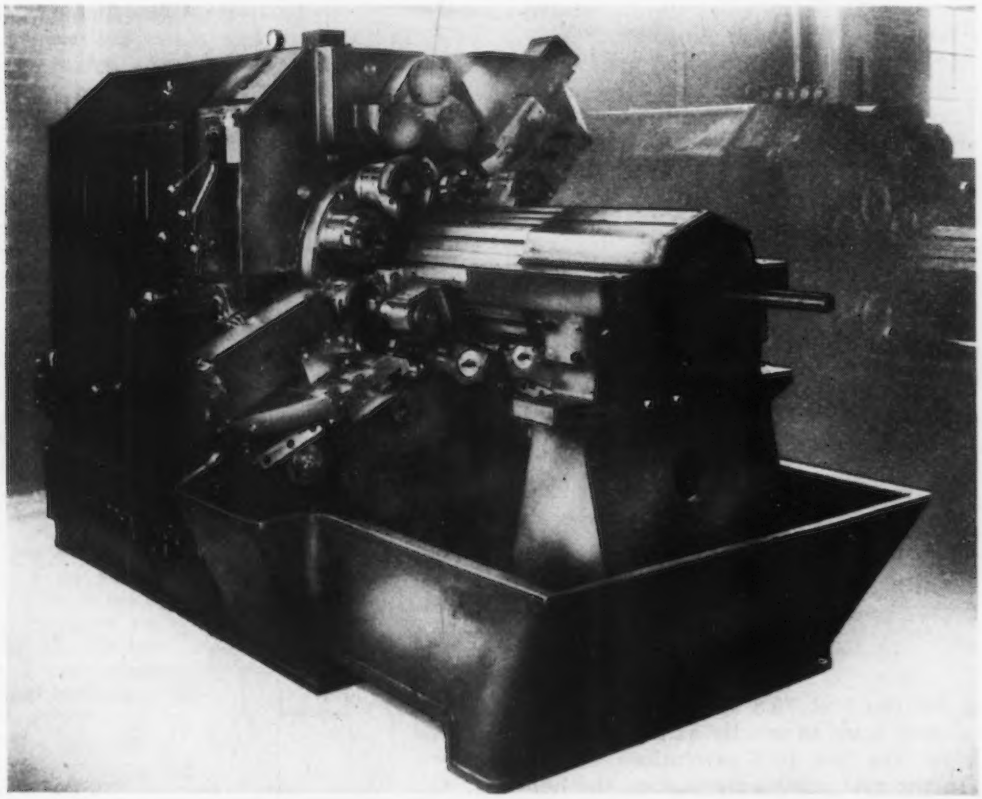


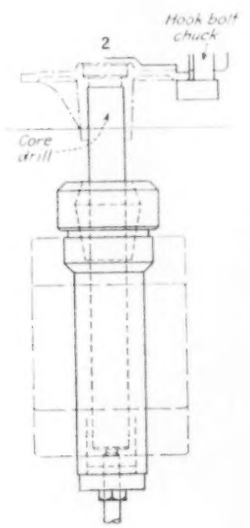
FIG. 3—The camper pulleys are machined in this chucker. The even numbered stations use a contracting type chucker where the odd numbered stations have the internal gripping or expanding chucker.

Another job, done on a New Britain-Gridley model 88 automatic machine is the machining of a water pump bearing housing for another automobile company. The model 88 is an eight spindle machine equipped with swinging type forming arms. The job was double indexed and the special feature is the multiple drill head in the last position that drills six holes simultaneously. These six holes are of two diameters, spaced unequally around the periphery of the part. This being a double index job, loading and indexing of the machine is the same as in the first job described.

As in machining the crankshaft or damper pulley just described, use is made on this job of the double rise cam technique for slowing down the feed rate on the tools as they approach the end of the feed stroke. This, as previously pointed out, helps reduce strain on the slides and cams as more tools are brought into play.

The 1160 rpm motor of the machine drives the spindle at a constant speed of 194 rpm. It takes 85.5 spindle revolutions to complete the machining of the longest operation. The part is cast iron; boring of the 1.180 in. diam shaft hole is done at 57.5 sfpm; and the OD of the flange at 325 sfpm. All tools on the machine except the drills are carbide. The work is machined without coolant. Counting the multiple drilling as one operation, there are 16 different operations on the piece detailed in fig. 4 and the production rate is 114 pieces an hr.

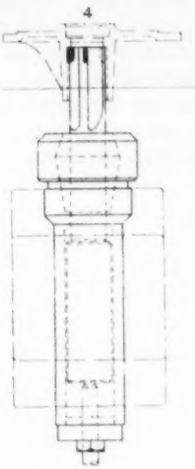
The piece is loaded in the eighth position of the machine with the hub side out and indexed into the second position. A hook bolt chuck is used to hold the piece. In this station shown in the sketch, a core drill is brought in on the main slide, which has a 1⅞ in. feed section double rise cam. The tool advanced 0.024 in. per



Second Position, Core Drill.

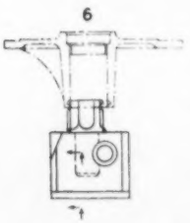
revolution for the first 75.8 spindle revolutions and then slowed down to exactly half that speed, 0.012 in., for the last 10.7 revolutions of the spindle. In the first machining station the hub is core drilled and the part is indexed to the fourth position.

The only work done in the fourth position is a rough reaming operation. The reamer is mounted on the main tool slide, reaming a hole 1.161—1.158 in. diam with a 0.005 to 0.015 in. radius at the base. The tool setup as well as cutter details are shown in the sketch.



Fourth Position, Rough Ream.

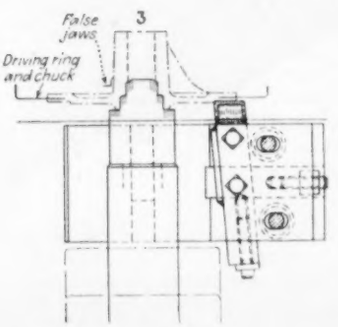
In the sixth position, a recessing tool is advanced by the main tool slide to groove and form a lip on the inside diameter of the bored hole. The difficulty of this operation is amplified by the fact that this groove and lip are an interrupted cut. This tool holder is advanced by the



Sixth Position, Groove and Form.

main tool slide and stopped by a holdback bracket when it gets into cutting position. The remaining forward motion of the tool slide feeds the tool holder up an angular cam and moves the recessing tool radially into the work.

This completes the rather simple operations in positions two, four and six, and the machine indexes to the eighth position where the operator takes the part out of the machine, turns it over and places it in the first position. In the first, third, fifth and seventh positions, the part is held in false jaws and a driving ring and chuck are

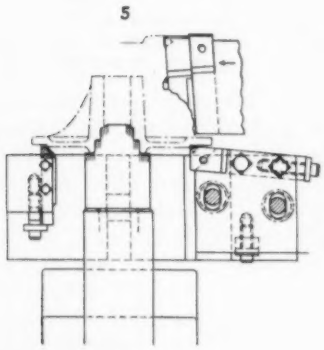


Third Position, Counterbore, Turn and Face.

used to rotate the piece. After reloading, and when all tools have finished working, the machine indexes to the third position.

In this station, there are a counterbore and a turning and facing tool mounted on the main slide. The counterbore continues the work on the main-shaft hole while the turning and facing tool turns the register diameter and faces the front face of the flange.

In the fifth machining position, four operations are performed. On the main tool slide are mounted a finish counterbore, a chamfering tool, and a turning tool, shown at the right of the



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Fifth Position, Finish Counterbore, Chamfer, Turn and Face.

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inset drawing for position five. Also in this position two facing tools come in from the swinging type forming arms. These forming arms are independently actuated through separate disk type cross-feed cams. They are of the swinging type and are positionable horizontally and radially to handle any angle and diameter of job without overhang. The facing tools are swung into the work by this forming slide and stepface the front of the piece. The facing tools are actuated by a 5/8 in. rise cam that has a steady advance of 0.0098 in. per spindle revolution. When these operations are complete, the part is indexed to the seventh position.

In this position the multiple drill head is mounted on the main tool slide. The whole unit is rotated from an auxiliary power unit on the end of the tool slide and the individual drills are driven separately within the head. The head is

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Seventh Position, Multiple Drill Head.

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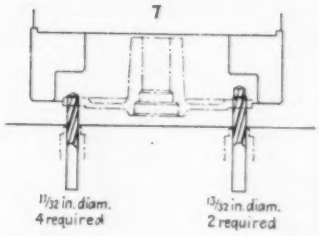

rotated at a slower speed than the spindle while it is advancing, but when the drills are ready to start, a dog on the chuck picks up the head and synchronizes it with the spindle. An overrunning clutch in the power unit compensates for the difference in speeds.

From the part diagram in fig. 4, it can be seen that the holes are of two sizes and are not evenly spaced either radially or circumferentially around the flange. When the drilling is completed and the drill withdrawn, the part indexes to the first position again, and the part is unloaded.

Drilling these six holes right on the chucker eliminates a second operation on a multiple drill press which would necessitate another operator, another machine, extra floor space, maintenance, and costly floor to floor time. It is applications such as this which enable manufacturers to hold their profit margins and keep themselves in a position to successfully meet competition.

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FIG. 4—This water pump bearing housing is machined by double indexing in an automatic chucker. The holes around the periphery of the housing are drilled in one of the machining stations thus eliminating a costly second operation machine.

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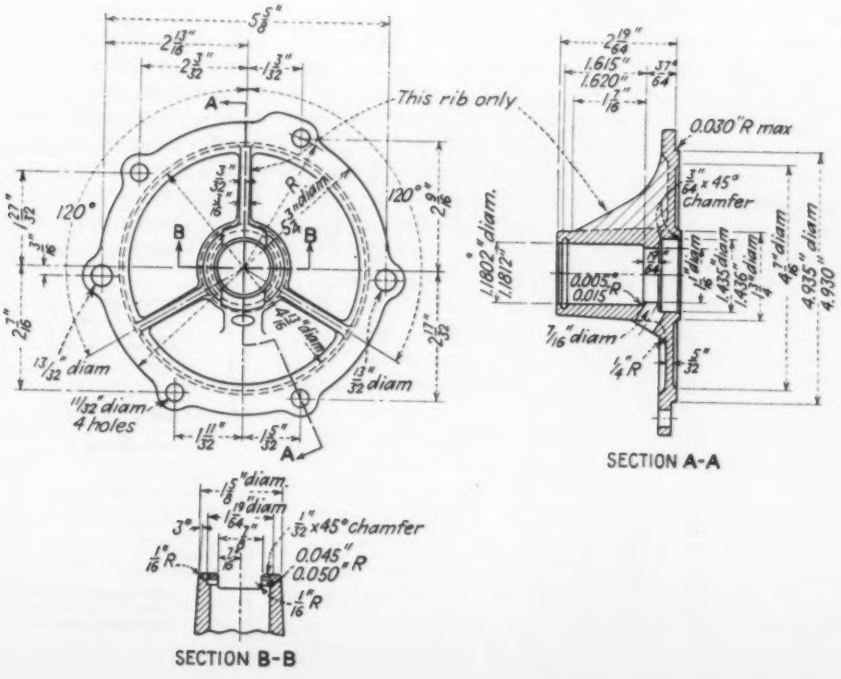
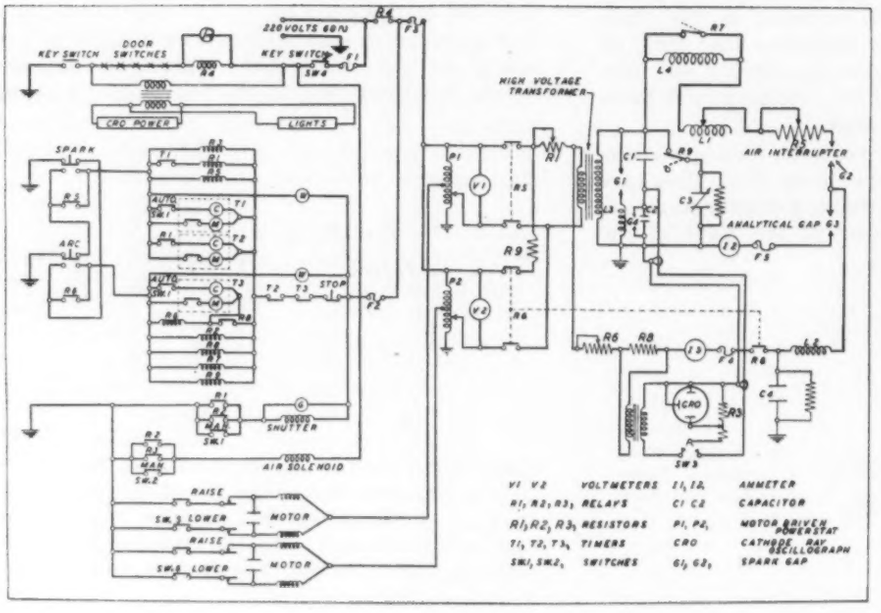




ELECTRICAL circuit of the improved spectrographic power source used for either spark or arc methods of analysis

Improved Spectrographic Power Source

GREATER accuracy in the reproduction of spectrochemical analyses is reported obtainable through the use of an improved electrical power source which has been adopted in the research department of American Steel & Wire Co., Cleveland. The unit, for both spark and arc methods of analysis overcomes inadequacies of earlier types of equipment by delivering an invariable energy output for given control settings.

Features of the new source are: (1) It is contained in a small packaged unit serving as a base for the spectrograph, thereby eliminating a separate source room; (2) it incorporates an air interrupter that eliminates the line-voltage control and high maintenance costs experienced with mechanical type interrupters; (3) an oscillograph mounted in view of the operator enables observation of excitation conditions and establishment of the reproducability of power output; and (4) the unit is applicable to all emission spectrochemical analyses.

The power source produces either a high-voltage ac spark or a low-voltage, spark-ignited ac arc. A simplified sketch of the circuit is shown in the accompanying illustration. Capacitors provide a range of 0.002 to 0.016 mf. Variable inductance in the spark circuit ranges from 10 to 40 microhenries. Approximately 300 microhenries inductance is permanently mounted and a variable resistance of 0 to 15 ohms is included in the spark circuit. In the arc circuit, 5 ohms primary resistance is permanently mounted and a variable resistance of 0 to 37 ohms with a secondary resistance of ½ to 9½ ohms is provided. Current in the spark circuit can be varied from 5 to 25 amps, while current in the arc circuit is variable between 0 and 5 amps. The safety gap has a graduated scale to simplify adjustment and the timers provide for presparking, sparking and arcing intervals from 0 to 120 sec.

In working with the new source, many parameters have been checked. The conditions found to give the best burn (no craters) and to provide readily reproducible and accurate results on steel samples are listed in the accompanying table.

Optimum Source Parameters for Spectrochemical Analysis of Steel Samples

Capacitance	0.010 mf
Inductance	¾ turn[1]
Primary Resistance	7 ohms[2] + 11½ ohms[3]
Current	19 amps
Prespark Interval	15 sec
Exposure	10 sec
Oscillograph Reading	3 breaks per ½ cycle
Peak Voltage	18,000 v
Air Pressure	2.5 psi
Auxiliary Gap (Air Gap)	6 mm (approx.)
Analytical Gap	4 mm

[1] Approximately 10 microhenries.
[2] Adjusted variable resistance.
[3] Permanently mounted resistance.

New Production Ideas . . .

New and improved equipment described this week includes foundry sand and core testing devices, an openhearth optical pyrometer, a foundry saw, pneumatic vibrators, stamping and extrusion presses, a special boring machine, a screw machine, sub-zero automatic equipment, an automatic recessing tool, a shearing control attachment, and a sheet thickness gage.

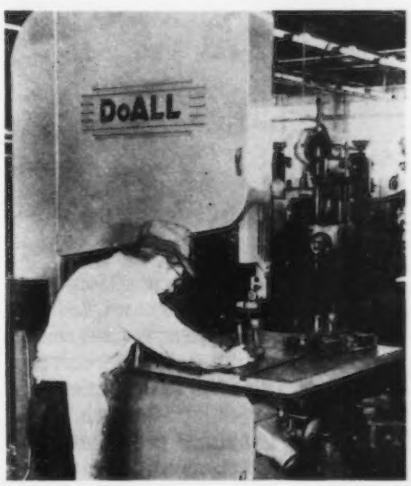
SEVERAL new items of molding and core sand testing equipment include the Permtester, a permeability tester that utilizes the time-pressure-volume of measuring. The time is measured for a definite volume of air at a fixed pressure to pass through a specimen of uniform size. Permeability values are indicated directly on the instrument without computations. The baked strength of core specimens can be determined on the Transverse Core Tester. The specimen is placed on two supports 6 in. apart and the load applied on the upper surface of the core by contact made with a strip of 3/32 in. steel on the upper fulcrum of the instrument. The load is applied by chilled-shot dropping from a hopper into a shot-can. Rate of application is 24 lb per min. When the core fails, the supply of shot automatically stops. Maximum capacity of the apparatus is 75 lb on the specimen. A combination Rammer-Compression Tester has been developed for preparing standard test specimens of bonded sands and for determining the strengths of sands in compression. A specimen is prepared by ramming sand into a sleeve located on the post of the instrument. The height of the rammed specimen is determined by a limit gage. After ramming, the specimen is stripped from its container without handling and is ready for testing. A spring dynamometer is used to measure the forces in compression. A re-set pointer on the gage indicates the maximum load in psi on the test specimen. A Sand Washer determines the clay content of molding sands. The apparatus has a stand for holding six tall-form beakers, a circular base supporting the stand, an electrically operated impeller, and a siphon. A stirring motor can be raised or lowered in the central post of the stand and the shaft of the stirrer has one blade for agitating the mixtures. Sand particles in motion impinge on six vertical baffles located around the wall of the beaker. Wash water levels are indicated by pointers for each beaker. Each of these units was designed to conform with recommendations of the Committee on Foundry Sand Research of the American Foundrymen's Society. *Precision Scientific Co. For more information, check No. 1 on the attached postcard.*

Openhearth Optical Pyrometer

DETERMINING molten ferrous metal temperatures in the critical range is simplified with the Pyro openhearth optical pyrometer. The reading scale has been lengthened and covers only the critical portion of the temperature range required. The standard temperature scale for black body conditions permits coverage from 2200° to 3000°F and an additional scale in red, corrected for the emissivity of molten metal reads from 2400° to 3300°F. Both scales are sub-divided into wide 10° divisions. The black body scale is used for measuring temperatures of furnaces, ovens, linings, fire boxes; the red scale permits direct and almost instantaneous readings of spout, pouring and ladle temperatures. The instrument is self-contained, direct reading, and weighs 3½ lb. *Pyrometer Instrument Co., Inc. For more information, check No. 2 on the attached postcard.*

Foundry Saw

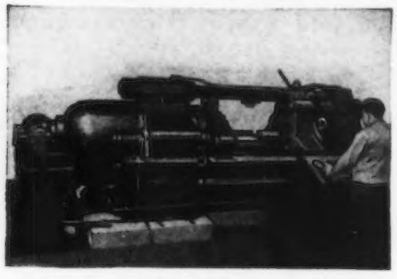
GATES and risers can be removed from castings by bandsawing with a new high-speed bandsawing machine. Lower tool cost, easy manipulation of work for closer trimming, and safety are advantages claimed for bandsawing. The model 36-L offers large work capacity in its 36-in. throat and 20-in. maximum thickness capacity. The main work table is 30x36 in. with handwheel operated table tilt 45° to right and 5° to left. An auxiliary table is 19x19 in. Frame and housing are all-welded-steel C type. Hydraulic brakes on both saw carrier wheels and complete saw



blade guarding are safety features. Saw guides are adjustable insert type for blades up to 2 in. *DoAll Co. For more information, check No. 3 on the attached postcard.*

Extrusion Press

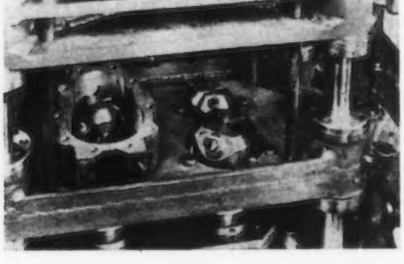
A NEW type oil-hydraulic extrusion press produces rods and shapes from aluminum, magnesium, and other non-ferrous alloys. The



self-contained machine is built in 500 and 1000 ton capacities, requires little floor space and minimum operating personnel. It is designed for accessibility and quick change of dies, making it possible to limit production to extruding the shapes actually needed. A production of 50 to 60 billets per hr can be obtained. *Hydropress, Inc. For more information, check No. 4 on the attached postcard.*

Special Boring Machine

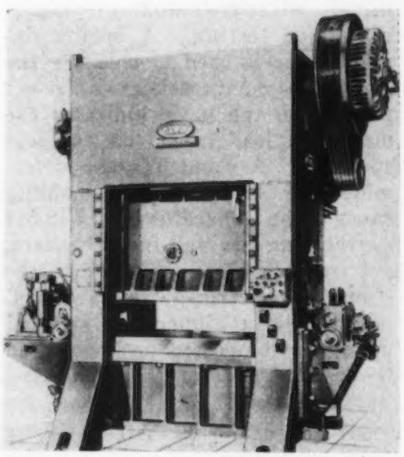
PRECISION boring pump housings to a tolerance of ±0.0005 in. for a total depth of 1½ in. through is possible with a new special machine that features a special four-spindle geared head positioned in an inverted position to clear out chips. A hydraulic cylinder locates and holds the parts during the bor-



ing cycle and the boring head has fast travel to boring position, then a normal boring feed, and fast return stroke. The part is progressed from left to right station, rough and finish boring at the same time. One part is completed with each cycle. The pump housings are located on four rest buttons with two dowel pins accurately positioning the piece for relationship. A spring loaded ram plate securely holds the parts during the boring operation. The machine is completely hydraulic, with Vickers equipment used throughout. DeVlieg microbore cutters are used in special holders. The machine has a variable speed rate with depth adjustment and automatic return. It is self-contained with electric and hydraulic controls and coolant system located in the machine tank. *Zagar Tool, Inc. For more information, check No. 5 on the attached postcard.*

High Production Presses

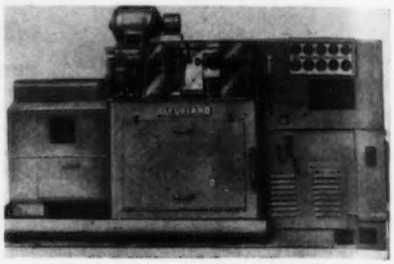
A LINE of mechanical presses with capacities from 50 to 800 tons and speeds to 250 strokes per min has been designed for stamping operations employing standard,



progressive, or multiple dies. Press frame components, including base, uprights, and crown are made of heavy steel sections, welded and stress relieved. Automatic feed of coil and strip stock increases part output. Presses may be obtained with the following drives: direct non-geared, crank-drive; single and double reduction gear, eccentric drive. A floating friction block clutch makes it possible to transfer 85 pct of flywheel momentum to the drive shaft upon engagement. An automatic oiling system lubricates press parts. *Danly Machine Specialties, Inc. For more information, check No. 6 on the attached postcard.*

Improved Screw Machine

RE-DESIGN of the main guard on the Dialmatic model AB 2½-in. single spindle automatic screw machine permits easy access to the tooling and facilitates chip removal. The front panel can be lowered, forming a chute for chip disposal. Visibility in the tooling area is increased by the use of Plexiglas in the front and rear guards. The AB Dialmatic features an electric feed drive that makes independent and infinitely variable forward and return tool feeds possible,



without cam changes, for each of the five tool positions in the tool turret. Forward and return feed settings are made by positioning 10 dialed rheostats on the control panel. Quick-disconnect plugs link all electric connections leading to and from the feed drive system. The electric control panel provides signal lights: two show the direction of rotation of the spindle; two show whether the spindle is in fast or slow drive; and two lights indicate whether the machine is in feed or rapid traverse. *Cleveland Automatic Machine Co. For more information, check No. 7 on the attached postcard.*

Pneumatic Vibrators

PNEUMATICALLY operated vibrators feature low air consumption, minimum number of parts, and instant starting with full power. They are suitable for

such applications as removing patterns from sand molds, hopper feeding small parts for assembly, fatigue testing complete assemblies, moving granular materials through chutes and tubes, and other applications where constant or intermittent vibration is necessary. Seven sizes are available with five different

mounting arrangements. Overall dimensions range from 5⅜x⅞x-1½ to 8x1¾x2¼ in. Air consumption ranges from 5 to 8½ cu ft per min on 80-psi line pressure. Operation speeds range from 1950 to 5100 vibrations per min. Piston diameters are ⅜, ½, ⅝, ¾, ⅞, 1 and 1¼ in. *Cleveland Vibrator Co. For more information, check No. 8 on the attached postcard.*

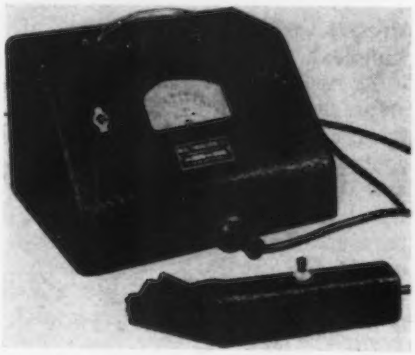
Piston Gage

NINE critical dimensions of an automotive piston are checked simultaneously on a multiple station gage that utilizes three gaging mediums, the Air-O-Limit, the Electrolimit, and Multiple Contact. To operate the gage, the operator places a piston on the automatic

loading mechanism and watches the lights and meters on the instrument panel. The piston is drawn automatically into gaging position. Green lights indicate undersize and red lights indicate oversize. The three meters show the variation in pinhole diameter, skirt taper and skirt diameter. *Pratt & Whitney, Div. Niles-Bement-Pond Co. For more information, check No. 9 on the attached postcard.*

Electronic Surface Comparator

SURFACE control of machined parts is provided by a new comparator, the Pico Surface Comparator, that checks surfaces electronically against an approved sample and assures accurate meter readings. It is a self-contained, portable unit that can be used on the production line without special accessory equipment or specially skilled operators. Readings are taken in 5 sec, by pressing the head against the surface being checked,



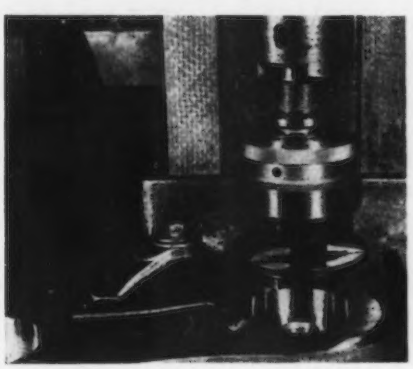
touching the actuating button and comparing the meter reading against the master reading. *Merz Engineering Co. For more information, check No. 10 on the attached postcard.*

Stock Insert

A ONE-PIECE insert features a new master stock pusher for automatic screw machines. No pins, screws, special wrenches or other devices are required for holding the insert. The bearing surface almost the length of the pusher assures a secure grip with less tension and pressure on the stock. Bar stock to the full rated size can be handled because of the elimination of protruding shoulders. Inserts are file-hard steel, chrome plated steel, nodular cast iron, bronze, and nylon. *Sheffer Collet Co. For more information, check No. 11 on the attached postcard.*

Automatic Recessing Tool

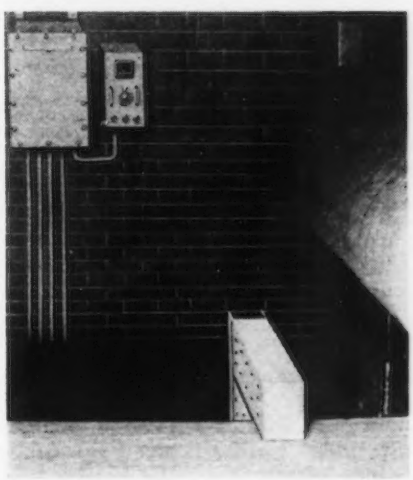
CUTTING grease grooves in drop forged steel links is possible with a new automatic re-



cessing tool used with a special cutting head. An automatic release after each cut allows a quick switch to the bore at the other end of each link. The bore of the link is 4.500 in. and the link is 1 in. thick. The tool is fully enclosed, making impossible the entry of chips to the operating mechanism. Graduated stop collars permit infinitely fine adjustment of location and diameter of groove. *Scully-Jones & Co. For more information, check No. 12 on the attached postcard.*

Thickness Gage

MEASURING continuously the thickness of sheet materials moving along a conveyer without contacting or disturbing the material can be accomplished with the new Beta-Ray Thickness Gage. The instrument measures the amount of beta-rays absorbed by the metal material being checked. By measuring absorption, the device actually indicates the mass per unit area of

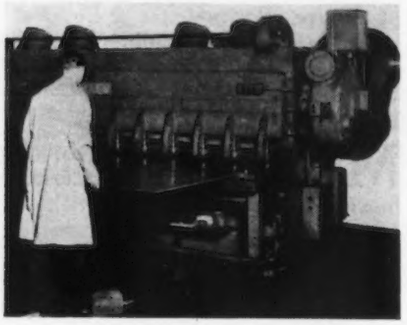


the material under test, but the equipment can be calibrated in terms of thickness to help operators maintain product uniformity, reduce the amount of rejected material, and save on the amount of raw material used. Operating on a power supply of 100-125 v, 60 cycles, ±0.3 cycles, power consumption of the gage is 150 w. Accuracy is said to be ±2 pct and drift is not more than 1 pct per hr after a 30-min warm-up. *General Electric Co. For more information, check No. 13 on the attached postcard.*

Shearing Attachment

TO simplify handling wide or long plates and sheets to be sheared on an all-steel shear with a full-length mechanical treadle, an electric clutch control attachment has been developed. It consists of a remote control foot switch that can be placed at any position convenient to the operator. The elec-

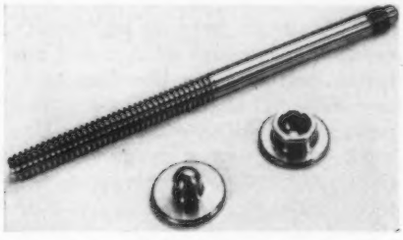
tric clutch control is also furnished with two foot switches and a selector for single or double operator control. With double control both operators must operate their foot switches before the clutch will trip.



The application of this control device to a shear increases its usefulness by speeding the handling, decreasing man hours, and increasing the output of the machine on this type of work. *Cincinnati Shaper Co. For more information, check No.* 14 *on the attached postcard.*

Machined Stainless Steel Parts

PRECISION parts, such as valve trim and many types of fastenings, are being produced from a super corrosion-resistant alloy called Carpenter Stainless No. 20. Machining characteristics of the alloy are reported to be very good, and because of its resistance to the corrosive effects of sulfuric acid and other highly corrosive agents, Stainless No. 20 is used for component parts that must have a life span equal to that of a cast assembly. In its wrought forms, the



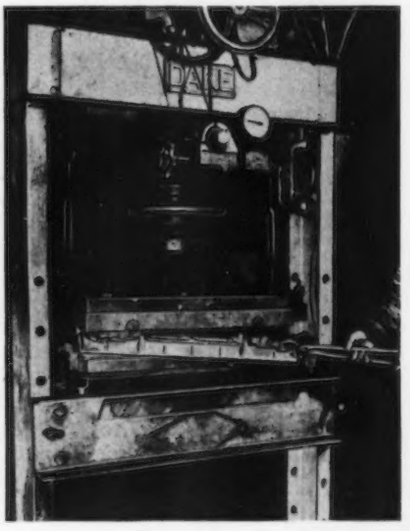
alloy is available in bar stock, wire, strip, tubing, pipe, sheet and plate. *Carpenter Steel Co. For more information, check No.* 15 *on the attached postcard.*

Smoke Detector

FOR industrial plant fire protection, a single unit photoelectric smoke detector offers a means of early detection of incipient fires in hazardous plant and warehouse areas. A continuous sample of air is drawn from the protected space through an individual piping system into an analyzer tube where it passes through a filter screen, into a beam of light focused on a photoelectric cell. Smoke in the air sample cuts down the amount of light reaching the cell and sets off an alarm connected through an electrical circuit to a control panel. The control panel transmits fire alarms and warns of mechanical and electrical disturbances within the apparatus. The smoke detector is a useful adjunct to built-in fire extinguishing systems, either automatically or manually operated. *Walter Kiddie & Co., Inc. For more information, check No.* 16 *on the attached postcard.*

Straightening Press

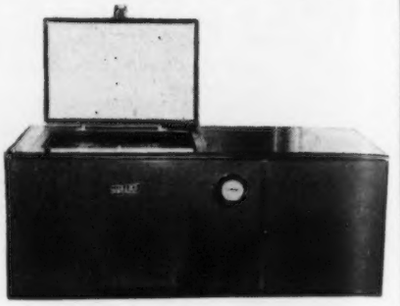
STRAIGHTENING iron castings prior to machining is simplified with the new 50HE Elec-Draulic press. The press is equipped with special straightening dies in which distorted castings are placed imme-



diately after their removal from the normalizing furnace, reducing rejects to 2 pct, it is reported. Production is rated at 400 castings per day, averaging 1.6 min per casting. A quick-acting release valve, eliminating the turning on and off of the motor for each pressing operation, lends speed to straightening procedure. An adjustable safety valve protects against overload. Other features include variable speed ram, movable workhead, an eye-level height pressure gage, adjustable table, and auxiliary screw-type ram. *Dake Engine Co. For more information, check No.* 17 *on the attached postcard.*

Sub-Zero Automatic Equipment

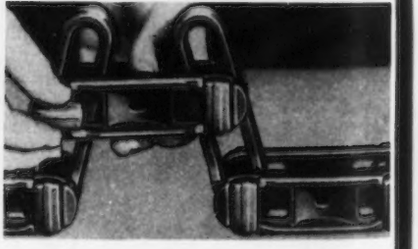
CUSTOM-BUILT low temperature equipment ranges from a 3 cu ft cabinet to especially designed test rooms. Temperatures of -100° to -130°F can be provided and



close electronic temperature control is available to maintain accuracy within 1/10 of 1°. The unit illustrated has been developed to shrink fit valve inserts, bearings, shafts and similar parts. *J. R. Miller Corp. For more information, check No.* 18 *on the attached postcard.*

Rivetless Conveyer Chain

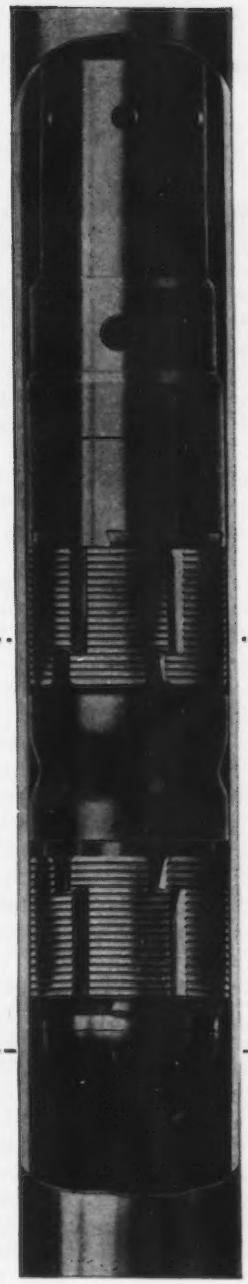
AN improved type Keystone rivetless chain is assembled or disassembled without tools. It has no rivets, welds or bolts, requires no special or joining links and may be disconnected at any point, yet it does not become disconnected or telescope in service. Its three components are the center or Keystone link, the side link and the connecting pin. The pin is locked against rotation in the side links that have been stiffened by a new type web. Improved design has increased the



strength of the chain without increasing the weight per foot. X-458 chain is interchangeable with standard 458-4-in. pitch chain. Ultimate strength of X-458 chain is 48,000 lb. *Jervis B. Webb Co. For more information, check No.* 19 *on the attached postcard.*

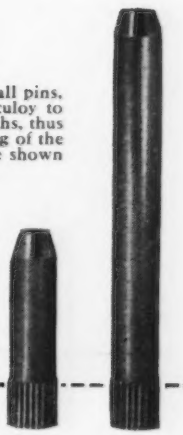
Midget Clamps

MIDGET clamps have been designed to locate small parts positively during machining opera-



Drillable Bridging Plug made by the Lane-Wells Company, Los Angeles, California, whose successful setting depends on the shear strength of two small pins of Revere Herculoy. These plugs vary from 38″ to 58″ in length.

These are the two small pins, made of Revere Herculoy to standard shear strengths, thus assuring proper setting of the Tripset plug. Pins are shown actual size.



Dependability protected through standardized-strength Herculoy

• Here is a case in which the successful operation of a large and somewhat complicated device depends upon one of its smallest and least expensive parts. The parts are two pins of Revere Herculoy. The device is a plug employed to seal off an oil well at any desired depth, to prevent taking oil or water from lower strata.

Proper setting of this plug within the well depends on those two small pins. They must shear at exactly the right load, imposed by a special setting tool. If the pins should shear too easily, the plug might not be securely set in the well and might fall to the bottom; if the pins were too tough, the plug might not set at all. From the material standpoint, successful operation of a device costing as much as $310.00 depends on the uniform shear strength of a few cents' worth of rod.

It was to assure that uniformity that the Revere Technical Advisory Service was called into action. Studies were made of the needs, tolerances specified, and means devised to assure meeting them. The specifications when finally drawn up were rather unusual, and their fulfillment is another demonstration of Revere's ability to turn out special orders when absolutely necessary. Incidentally, Lane-Wells Company, maker of the Drillable Bridging Plug, also uses Revere phosphor bronze, strip brass, Herculoy rod and free-cutting brass rod for other parts.

Before you place your next order for copper and copper alloys, get in touch with the nearest Revere office. And remember, if you are having any difficulties in the employment of copper and brass mill products, the Revere Technical Advisory Service will gladly collaborate with you.

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Assembly Line . . .

WALTER G. PATTON

• The auto industry's competitive struggle over automatic transmissions is only beginning . . . Customers will buy 'em after they try 'em, say the auto salesmen . . . UAW-CIO states its position on "Profit-sharing."

DETROIT—The American automobile buying public is indeed a curious critter.

Ask almost any motorist what he wants most in a motor car—next to lower prices and satisfactory performance — and he'll tell you, "More economy." A day or two later, the same car owner will go into a car dealer's showroom and pay several hundred dollars for an automatic driving device such as Hydra-Matic or Dynaflow. Such an automatic gear shifting device definitely gives the car owner much greater driving ease but it does not, as yet, give him more economy of operation.

This is not to say there will always be a gasoline penalty for automatic gear shifting. Some car producers are claiming they already have a transmission in which there is no penalty insofar as gas consumption is concerned; others contend the fuel penalty is largely a matter of how you drive your car.

Whatever the merits of this argument, the automobile industry is laying all its blue chips on a line which says that automatic transmissions are a "must" in tomorrow's motor car.

GM is building a large new transmission plant in Detroit for its Hydra-Matic units. More than a million of these units have already been installed in Oldsmobile, Cadillac and Pontiac cars. Unless something unforeseen happens, these same GM units will be installed on Lincoln and Mercury in the near future.

Since production began a year ago, Buick has turned out more than 125,000 of its Dynaflow transmission units. Production is currently at a rate of 1100 per day. This schedule is expected to be increased when Dynaflow is offered as optional equipment on a new series of Buick cars to be introduced this summer.

From this point on, transmission developments in the auto industry taper off into a field of rumors and broad speculation, all of which, however, lead inevitably to the conclusion that automatic transmissions will be standard equipment on practically all United States passenger cars within a year or two.

Consider these facts, for example: Within a few weeks Packard will introduce a new automatic unit which climaxes more than 10 years of intensive research and development. It is no secret that a self-shifting transmission has been one of the most cherished dreams of George Christopher, president of Packard. All the engineering stops have been pulled out at Packard for months to bring the new unit to engineering perfection. Current reports indicate Packard may have something that is definitely in advance of any of the other devices now available.

It is an open secret that Chevrolet is readying a plant at Cleveland to produce a new torque converter type transmission unit.

IT is believed that Studebaker is close to a major decision that will start the tooling for a new automatic transmission. Nash has already made a decision about its new transmission, it is reported, but there is no evidence to show that tooling has been placed with local suppliers.

If Chrysler has any transmission devices other than the semiautomatic units in its new cars, company officials are, as usual, keeping very quiet on the subject. Reports here this week indicated that Hudson, too, may be interested in a torque converter type transmission unit.

The biggest question mark of the moment is, of course, what has actually happened to the Ford automatic transmission. More than a year ago, it was reported by top Ford engineers in New York that a decision had been made to use a Borg-Warner unit. Since that time, Ford transmission plans have blown alternately hot and cold. Incidentally, Borg-Warner is reported to have anywhere from five to a dozen different devices well along in the development stage.

Determined driver opposition seems to be about the only force that can turn the trend toward automatic transmissions for passenger cars. According to automobile executives, however, driver opposition to the new devices is easily overcome once the driver has had an opportunity actually to drive a car equipped with an automatic gear shifting device. The automobile industry is completely confident that automatic transmissions will sweep the industry within the next year or two.

* * *

THE question of profit-sharing agreements with labor unions always comes up for discussion at the time of wage negotiations. This year is no exception.

The UAW-CIO has taken a position strongly opposing profit-sharing wage plans for its members. This opposition is expected to be particularly vocal in the months ahead.

Justifiable or not, here are some of the union arguments against profit-sharing wage plans:

(1) Lack of stability of income for the worker. When management talks about profit-sharing, say union spokesmen, it is really talking about "flexibility" or ability to cut wages without negotiations when profits go down. Union economists also say that reducing wages as prices and profits go down merely

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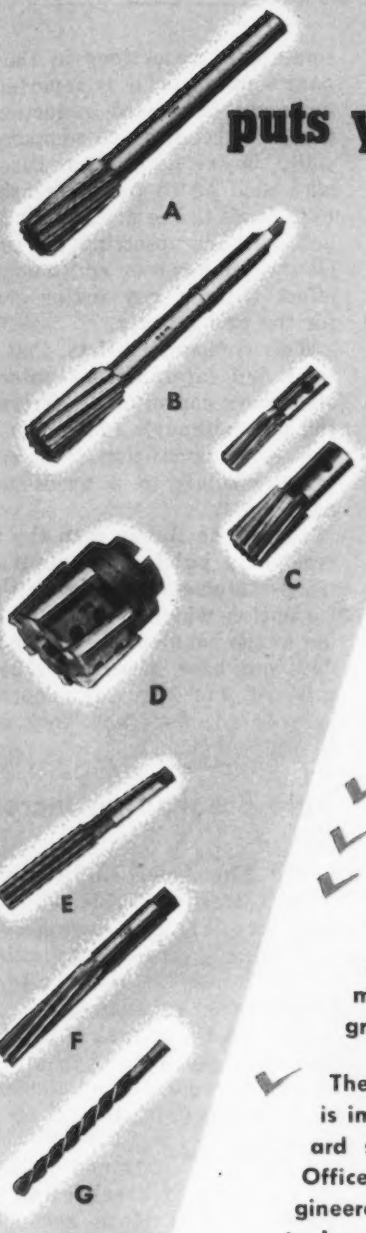

Experience-proved, performance-tested P&W Reamer Design includes . . .

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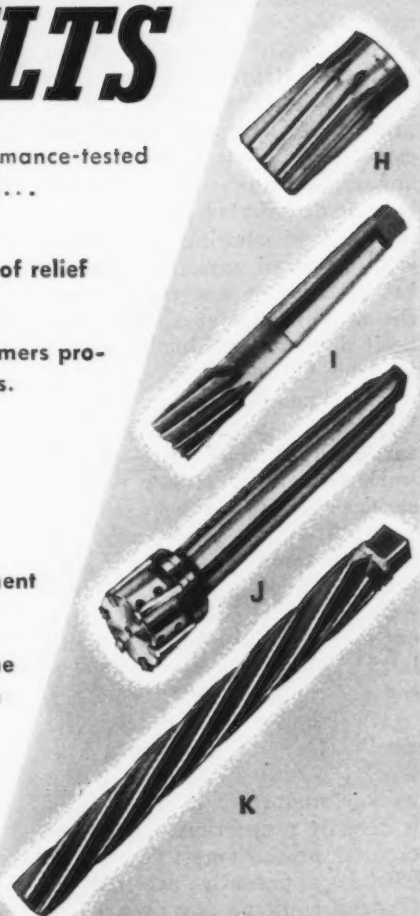
You'll find it will pay to head this way for better reamer results. Run comparative tests and note the savings effected.



(A) "Blue Helix" Chucking Reamer — Straight Shank (B) "Blue Helix" Chucking Reamer — Morse Taper Shank (C) Stub Screw Machine Reamers (D) Camlock Adjustable Shell Reamer (E) Taper Shank Jobber's Reamer (F) Hand Reamer (G) Helical Taper Pin Reamer (H) Shell Reamer (I) Precision End Mill Reamer for Jig Borer (J) Camlock Adjustable Chucking Reamer (K) Duplex Spiral Locomotive Taper Reamer.

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lowers the buying power level that is necessary to maintain an adequate volume of business.

(2) Profit-sharing means profits first. In most profit-sharing plans, management comes first, says the union. If anything is left, then and only then, the workers get their take.

(3) Profit-sharing plans are not stable. Out of 161 plans recently studied by the National Industrial Conference Board, 60 pct have been discontinued. Plans are usually dropped either because of worker dissatisfaction or because there is too little profit to be distributed.

(4) Profit-sharing is really a step backward, says the union. It brings another uncertainty into the worker's life at a time when he is doing everything he can to increase his security.

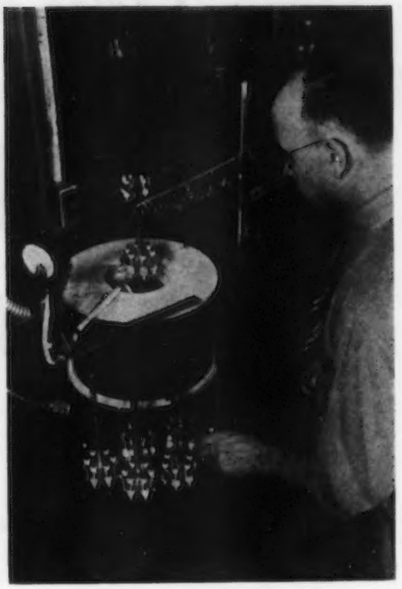
(5) Wage advantages accruing to the workers are often earned at the expense of the worker's health, recreation and services to his family.

(6) Too much depends on what management does. Mistakes in buying materials, poor engineering of the products or even bad selling tactics may largely determine labor's return, say union officials.

(7) Labor's reward is too small. Under a piece-work system of wages, it is argued, the worker would get a return that is directly proportional to his increased production. Top union officials apparently are not in favor of splitting any rewards of increased productivity by the worker.

(8) Many of the objections of the union apparently stem from the fact that profit-sharing plans sometimes place union negotiators at somewhat of a disadvantage. Accounting often becomes unduly complicated, they contend, and management has been known to play hocus-pocus with its books, even to the extent of falsifying its records, according to union charges. The union also has some objections to the fact that wage rates and industry-wide job standards are often upset by profit-sharing plans.

In other words, profit-sharing often runs head-on into union aims of industry-wide bargaining. Union officials also argue in the latest issue of their publication, *Ammunition*, "Quite soon, workers find profit-sharing puts competition between the workers in the place of orderly collective bargaining." This is believed to be one of the strongest points of opposition on the part of the union officials to profit-sharing plans.



SHOCKING: *Shown in the photograph is a laboratory technician at AC Spark Plug Div. giving spark plug insulators a heat shock test to determine ability to withstand temperature changes. Spot checks are made on insulators by dipping them in molten tin under controlled temperatures. This is only one of several tests to determine the acceptability of a modern automobile spark plug.*

IN its most recent issue, *Ammunition* also calls attention to what it regards as fundamental weaknesses in the Bundy "Cost-Savings Sharing" plan. What will happen to the plan if the company cuts prices? According to union estimates, a 10 pct cut in prices could wipe out all but 4 pct of the increase in wages obtained as a result of boosting production 20 pct. The union also says the workers have no control over the plan which can be eliminated at any time by management.

Management's version of the story is, of course, somewhat different from the union position. According to a company spokesman, during 3 years of operation Bundy has paid out to its workers $1,682,157, or an average of about 25¢ per hour over and above the usual hourly rate for its various wage classifications. There have been some price reductions in the company's products, it is reported, but no across-the-board reductions in prices. According to company officials, the selection of the base year was such as to permit reasonable reductions in the prices of its products without upsetting the present plan which has been continuously in effect without any major changes for the past 3 years.

The company insists that both local and international union officials were consulted in arriving at the plan although admittedly there was some opposition from certain union officials to a profit-sharing agreement.

Under the Bundy plan the union receives a public accountant's certified statement containing the information which is used in arriving at the bonus figures. The union does not have access to other details of the company's operating records. It does not "look at the books."

•

Auto Breakdowns Increase

Detroit

• • • **The American** Automobile Assn. estimates 40,566,000 trouble calls were handled during 1948.

This is increase of approximately 9 pct over the number of auto breakdowns estimated for 1947.

The AAA's annual estimates of motorists' mechanical troubles are based on reports from 16,000 service stations in the U. S. and Canada.

Flat tires continued to be the major cause of breakdowns. Batteries were a close second, increasing 13 pct as compared with the year 1947.

Other causes of car failures in order of importance are: Traffic smashups, ignition trouble, starter trouble, out of gas, and lock and key service.

•

Packard Deliveries Up

Detroit

• • • **March** was the fourth best sales month in the history of the Packard Motor Car Co.

Packard dealers delivered 11,594 units to retail customers during the month.

March deliveries brought the total number of cars sold during the quarter to a level 55 pct ahead of the same period of last year. A total of 25,076 Packard units were delivered during the quarter.

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Washington . . .

EUGENE J. HARDY

• End of steel shortage does not silence government critics . . . Louis Bean whoops it up again . . . Co-ops consider steel mill purchase . . . Government intervention on capacity still urged.

WASHINGTON—Several months ago this column pointed out that regardless of prospective balancing of steel supply and demand the pro-expansion fanatics in Washington would not be silenced. (THE IRON AGE, Jan. 20, p. 82.) This was borne out last week at a tub-thumping panel discussion, entitled "Steel—The Industrial Bottleneck," sponsored by the Cooperative League, U. S. A. The chief tub-thumper was Louis H. Bean, an unquenchable prognosticator of the steel industry's future and the Dept. of Agriculture's leading steel expert.

The occasion for the discussion was an Economic Action Conference held by the Cooperative League and attended by representatives of farm, labor and cooperative organizations. Its announced purpose was "to seek common ground for economic freedom," but for the steel industry government intervention was the conference keynote.

Mr. Bean's rather tiresome arguments on the need for more and more steel capacity were warmly endorsed by Murray D. Lincoln, Cooperative League president, who also revealed that cooperatives were considering the purchase of a steel mill. Declining to comment on the mill under consideration, Mr. Lincoln expressed the opinion that cooperatives are already distributing enough products to use all the steel produced by this mill. Mr. Lincoln added that such a purchase by the cooperatives would be in line with the President's recommendations regarding steel production and capacity.

THE sponsorship of the conference is of particular significance since the individual who arranged the meeting, including Mr. Bean's appearance, was John Carson, Director of Research and Information for the Cooperative League. Mr. Carson, it will be remembered, was recently nominated by the President to fill a Republican vacancy on the Federal Trade Commission. He is characterized around Washington as "a fiery New Dealer." The White House announcement tabbed him an independent. His views are definitely prolabor and, if confirmed by the Senate, it is difficult to see how his presence on the commission until 1952 could result in anything more than another violent critic of business having an official agency of the government as his own private sounding board.

Since there is now only one Republican on the 5-man commission and the law specifies that not more than 3 members can be from the same political party, it seems rather apparent that the Carson appointment violates the spirit if not the letter of the law.

Mr. Bean's appearance on the program set up by Mr. Carson gave the Agriculture Dept. economist another opportunity to repeat his oft-reiterated demands for steel capacity of 110 to 115 million tons. (THE IRON AGE, Aug. 15, 1948, p. 104.) While his basic theme remained the same, Mr. Bean last week embellished some of his points with slightly new arguments. For example, he kissed off the now apparently normal situation in steel by attributing it to the alleged philosophy of planned scarcity practiced by the steel industry. Or, in other words, he maintained that the demand for steel has been brought down to the available supply rather than the supply being increased to meet the demand. This is what Mr. Bean describes as a depression psychology.

HE also elaborated on his earlier statements that steel industry executives do not know how to plan for the future. "The job of indicating future demand cannot be left to industrial leaders alone," according to Mr. Bean, but must be placed in the hands of other specialists whose task it is "to study population trends and national needs that transcend the current responsibilities of executives to their businesses."

Mr. Bean is a self-admitted specialist. In Mr. Bean's own words, men such as Walter Tower, of the American Iron & Steel Institute, and B. F. Fairless, of the U. S. Steel Corp., are "not the men from whom you can get the proper trend lines." He maintains that their primary job is "planning and managing production and sales."

Despite Mr. Bean's deprecation of the ability of industry economists, it is worth noting that many government agenies have borrowed economists from the steel and other industries, and that some of these men are still holding responsible jobs in government. Still there is nothing new in this philosophy which holds that business cannot manage its own affairs and it was bound to crop up again now that the severe steel shortage is a thing of the past.

With the steel shortage at an end, Mr. Bean claims that his crystal-balling indicates that steel is the basic problem of *tomorrow's* rather than *today's* market. He

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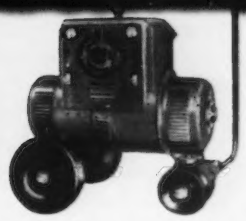

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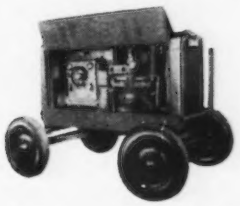

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states that, if the industry does not increase its presently planned expansion four or five fold, steel will be a greater industrial bottleneck in the 1950's than it was during the past few years. According to Mr. Bean's most recent calculations the country needs 2/3 of a ton of steel per capita; 1.8 tons per person employed in a full employment economy, and 2/3 of a ton for every billion dollars of gross national product at 1939 levels. It will be readily seen that all this adds up to 100 million tons of steel based on a population of 150 million people in the early 1950's.

ADMITTING that present production at an annual rate of 97 million tons approximates more nearly normal than the 88 million tons turned out last year, Mr. Bean maintains that existing capacity is inadequate for present and future normal demands. He claims that the industry should embark on a new program for 10 million tons additional capacity as an immediate objective with considerably more as the ultimate objective.

Attempting to explain his earlier statements that the country cannot have full employment without 100 million tons of steel, he stated that full employment in 1947 and 1948, even with steel shorages, resulted in total national production at a lower level than would have been possible had these shortages not existed. Further admitting that 1947 and 1948 were record peacetime years for steel production, Mr. Bean told his receptive audience, "Do not be fooled—it is not record breaking enough." Shortages of steel and other basic commodities over the past 2 years, according to Mr. Bean, resulted in a production loss amounting to $25-$30 billion; a loss of $15 billion in wages and salaries; a loss in farm cash income of $3 billion, and a drop in purchasing power of at least 10 pct. In his opinion, "The shortages of 1947 and 1948 have already done their damage. Prices advanced in 1947 and 1948 beyond the capacity of millions of consumers of durable goods to stay in the market. We are witnessing the cycle of shortages begetting inflation, inflation begetting tardy expansion, and the two together helping to bring on a temporary falling off in demand—a check to further plans for capital expansion."

Mr. Bean was followed on the program by two labor representatives, Harvey Brown, International Assn. of Machinists, and Don Montgomery, United Auto Workers, CIO. Mr. Brown's presentation was limited largely to vigorous pronouncements that the gray market in steel must go and steel shortages must end. Endorsing the President's proposal relating to steel expansion, Mr. Brown declared that the industry "will not voluntarily do the job of providing sufficient steel."

Mr. Montgomery, following the CIO line, accused the steel industry of planning for a depression and said that the basic bottlenecks are still unbroken. He, too, endorsed the President's proposal.

THE BULL OF THE WOODS — BY J. R. WILLIAMS

Consumers' Price Index Declines in 61 Cities

Washington

• • • **Consumers' prices** were down 1.0 pct from January to February 1949, according to the National Industrial Conference Board. Declines were reported in 61 of the 62 cities included in the Board's monthly consumer price survey.

February was the eighth month since January 1948 during which the Board's index failed to advance. Previously in 1948, declines were registered in February, March, October, November and December, as well as in January 1949. The index remained unchanged in September 1948. However, 7 months ago (August 1948), the Board points out, the series (which goes back to 1941) reached its all-time high (166.5 Revised).

The Board's index for February 1949 stood at 161.1, compared with 162.7 (Revised) in January 1949. A year ago, the index was 160.6. Base date of the series is January 1939 as 100.

From February 1948 to February 1949 the weighted average of all items in the index was up 0.3 pct.

The purchasing value of the dollar (January 1939 as 100¢) was 62.1 in February 1949.

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West Coast.

ROBERT T. REINHARDT

• Supply and demand as well as technical problems interest visitors to Western Metal Congress... Production of heavy steel castings in West to end soon unless government foundry is picked up.

LOS ANGELES — Despite the newsbreak on the dramatic and tragic story of attempts to rescue a small child from an abandoned well and the most severe earthquake in the history of the Pacific Northwest, this area has been made aware of the importance of the metal producing and fabricating industry through the Western Metal Congress and Exposition which closed last Friday.

Never before had such a large contingent of metals men gathered in one place in the West to discuss their economic problems, as well as technical problems, and they found plenty with which to conjecture.

Producers, of course, were figuratively set back on their heels at the news of the abrupt drop in scrap prices in the East and attempted to interpret its affect on the local situation. Best informed sources among both scrap buyers and sellers was that no immediate reaction could be expected, but that within a few weeks a still further softening of the market would become apparent here. Large inventories of scrap held by steel producers forestalls immediate buying at any price and dealers claim they don't know where they can collect scrap at the prices they can afford to pay.

Scrap dealers aren't too happy, and several claim they can't stay in business under even the present price scale. One company which entered the field about a year ago is in bankruptcy with its equipment going begging. The father and son partnership of Nathan and Louis Hochman who came to Long Beach, Calif., from Canada to found the California Hydraulic Metals, Inc., is selling off its more than $50,000 worth of equipment or equities in such equipment, in addition to a hydraulic baler worth more than $50,000 and underground scale which haven't as yet been released for sale because of real estate involvements. A bankruptcy sale advertised for Apr. 14 was unattended and another opportunity will be offered buyers Apr. 25.

Further "evidence" of the softening of the steel market came to the attention of those attending the conference through rumors to the effect that "some steel producers" were selling in San Francisco and Los Angeles at prices which indicated freight absorption. On close checking, however, the "evidence" was rather weak. Only nails were being priced at figures indicating some freight absorption, but even in this product amounts purchased or even quoted could hardly be said to indicate a trend. Structurals, plates and sheets were holding firm last week.

THAT steel is still not a drug on the market is indicated by the swindles being pulled by enterprising gentlemen of the underworld. Warehouses are being warned to beware of telephone orders for so many tons of such and such an item to be called for by truck and billed to so and so fabricators. It seems these boys move in with their truck, haul away the steel and that's the end so far as the gullible supplier is concerned.

Steel plate—which not too many years ago was expected to be a drug on the western market—is still terrifically tight because of pipe line commitments. Demand for gas and oil pipe continues so heavy that Consolidated Western Steel Corp. is considering a new unit at San Francisco to fabricate for both domestic and export demand which means that there is little likelihood of plate relief for several years.

Walter Mathesius, president of Geneva Steel Co., told Los Angeles Rotarians and guests during the conference: "While there may be trials and road blocks ahead from time to time in the normal competitive battles of free enterprise for its fair share of the market, and against the ever present threat of regimentation into more planned economy, I can see no indication of any letdown or reversal in this western expanding trend for the long pull."

Tom W. Lippert, directing editor of THE IRON AGE, told the same group that scrap prices and the trend of steel producers toward a reduced production rate were economic indices worth watching.

Foundry Closing Limits Production of Castings

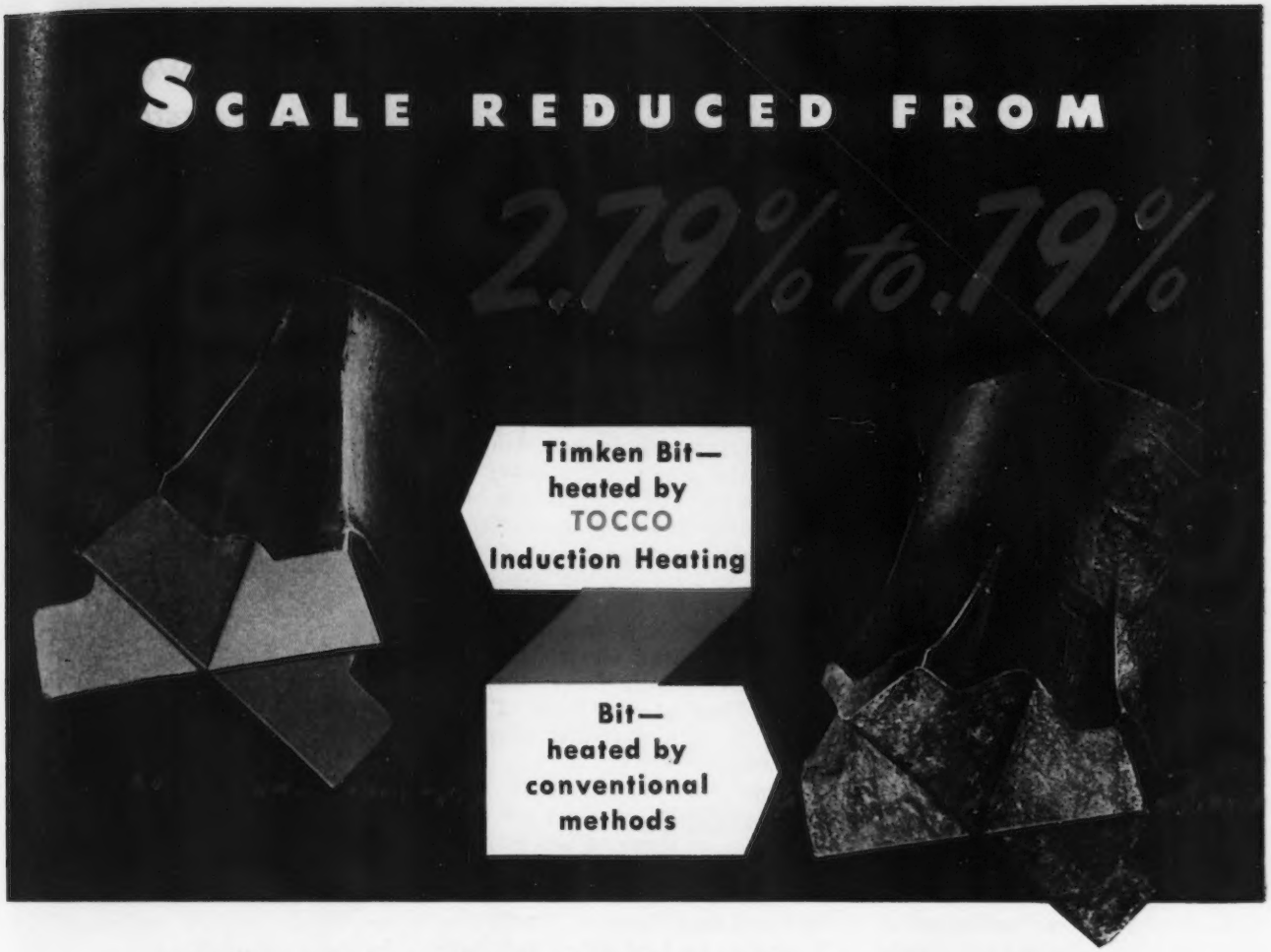
San Francisco

• • • **With the closing** of Columbia Steel Co.'s foundry at Pittsburg, Calif., the West will be without operating facilities to produce castings heavier than 15 tons.

According to O. L. Pringle, Columbia's vice president in charge of operations, the Pittsburg foundry will complete its present commercial orders by about July 31 and probably the unit will be closed entirely although there is still a possibility of continuing with production of castings for the company's use.

At the present time the foundry is completing large castings for turbine pump races weighing

SCALE REDUCED FROM 2.79% to .79%



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65,000 lb for Grand Coulee Dam, and railway car castings. The passing of this foundry will see the death of the original unit of the present Columbia Steel Co. which was organized in 1910 as the Columbia Steel Corp. to make steel castings for the mining industry. Such companies as Natomas Co. and Yuba Consolidated Gold Fields were the original owners.

The largest single unit ever cast at Pittsburg is believed to be a 75,000 lb housing for a 36-in. rolling mill. The largest steel castings ever produced in the West are believed to be the two halves of a 168-in. butterfly valve each of which weighed 85,000 lb and were cast at the Torrance, Calif., foundry of Columbia Steel which closed down last year. These two facilities had been capable of handling anything demanded for western use in the way of heavy steel castings with the exception of a 110,000 lb butterfly valve which had to be made in the East.

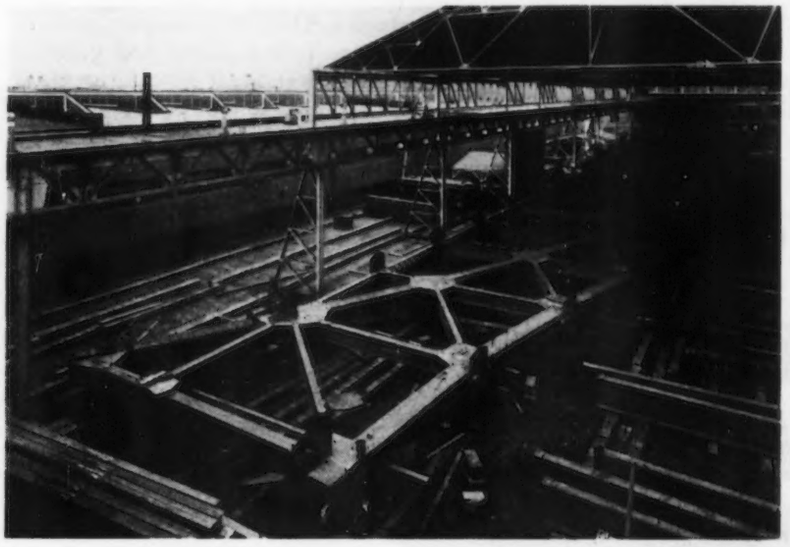
The elimination of both the Torrance and Pittsburg foundries of Columbia leaves the door wide open for some entrepreneur to reopen the government owned foundry at Pittsburg, Calif., not far from Columbia's plant. This unit was operated during the war by Columbia and had been up for bid several times through the WAA with no takers.

With facilities to produce steel castings up to approximately 80,000 lb, two 30-ton openhearths and a small electric furnace, it would appear to be an inviting investment since it would have a virtual monopoly in production of steel casting heavier than 30,000 lb west of Chicago. However, foundrymen who have considered purchase or lease express the opinion that an investment of from $1 to $2 million would be needed to carry the necessarily heavy inventory and equip the unit to handle smaller job work essential to full scale operation. That kind of money isn't too readliy available.

Until early this year Pacific States Steel Corp. was using the openhearths and electric furnace to produce ingots for conversion and rolling at its Niles, Calif., mills. Foundry facilities were not in operation.

Remaining in the heavy steel casting field in the West are such foundries as those of Los Angeles Steel Casting Co. with about a 10-ton limit; General Metals Corp., Oakland, and National Supply Co., Torrance, each of which can handle up to about 15 tons; and Columbia Steel Foundry, Portland, Ore., which has a limit of about 10 tons.

PREFAB: *Moore Drydock Co. of Oakland, Calif., is prefabricating three structural steel trusses, 58 ft wide, and 336 ft long between pin centers for the Manuel Quezon Bridge to be assembled over the Pasig River, Manila, P. I. This is one of the three trusses assembled, reamed and match-marked after which it will be knocked down for shipment.*



Develop New West Coast Aircraft Center

Los Angeles

• • • **Major industrial** development in the small town of Palmdale, Calif., on the edge of the Mojave desert, 50 miles from here, has been forecast by many real estate men who expect industries connected with aircraft manufacturing to move to that area.

Most of the aircraft plants around Los Angeles have been hemmed in by other factories, and the majority of tests for jet aircraft of the supersonic speed type are conducted at Air Force and Navy fields in the desert area of Muroc and Inyo-Kern with the planes being towed to those places.

Los Angeles County is spending several hundred thousand dollars developing a new major airport at Palmdale with a runway and facilities capable of handling jet aircraft.

Although none of the major companies officially have indicated a program to move, some observers expect them to build facilities in the area of the airport within a few years as this is one of the last remaining sites in southern California for such an activity.

At the Kaiser steel plant near Fontana, Calif., the University of Southern California has been operating a wind tunnel and conducted tests for several years using one of the powerful air compressors of the steel company. These operations will shortly be moved to the Navy's Pt. Magu base to free the compressor for use in connection with Kaiser's second blast furnace now under construction.

Constructs New Warehouse

Portland, Ore.

• • • **Barde Steel Co.** has purchased a 17-acre tract of land and announced the construction of a $2 million warehouse to house its own distribution facilities and provide additional rental space. The new building will provide 80,000 sq ft and will be an addition to the present 75 x 800 ft warehouse according to Jack N. Barde, company president.

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PERSONALS

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• **C. H. Butts** has resigned as operating vice-president, Sharon Steel Corp., Sharon, Pa., effective May 1. No successor has been named.

• **W. J. Osborn** has been made district manager at San Francisco for the Hagan Corp., Pittsburgh, succeeding **Clyde F. Williamson,** who resigned. Mr. Osborn joined Hagan in 1940. **Alfred Pittman** has been appointed marine manager at the San Francisco office. He joined the company in 1942 after many years of engineering service for various steamship lines.

• **Charles Phelps,** director of industrial relations of the Carborundum Co., Niagara Falls, N. Y., has been promoted to manager of corporate insurance. **J. H. Denton** has been made manager, sales administration, in the home office, succeeding **D. S. Masson.**

• **Charles A. Kral** has been appointed general manager, steel division, Newport Steel Corp., Cincinnati. Mr. Kral joined Newport Steel in 1948, having previously been associated with Jones & Laughlin Steel Corp., Pittsburgh.

• **W. E. Hanford,** director of petroleum and chemical research since 1948 for the M. W. Kellogg Co., New York, has been elected a vice-president of the company. Dr. Hanford joined the organization in 1946 and had been previously associated with General Aniline & Film Corp.

• **E. Lowe McIntyre, Jr.,** has been named assistant sales manager in charge of new market developments, Electric Products Co., Cleveland. Mr. McIntyre had formerly been associated with Westinghouse Electric Corp. and Jack & Heintz Precision Industries, Inc.

• **Thomas A. Goodridge** has been appointed assistant to the president of Maremont Automotive Products, Inc., Chicago and New York. Mr. Goodridge formerly served the Crucible Steel Co.

MAURICE J. MAHONEY (left), secretary, and CHARLES A. TAYLOR (right), controller, Copperweld Steel Co.

• **Maurice J. Mahoney** has been elected secretary and **Charles A. Taylor,** controller, Copperweld Steel Co., Glassport, Pa. Mr. Mahoney joined the company in 1941 as attorney and tax officer and had previously held tax and legal positions in the Dept. of Justice. Mr. Taylor has been with the company since 1939 as assistant controller, and had previously been an agent for the Internal Revenue department.

• **C. A. Tate** has joined the Pittsburgh office of Harbison-Walker Refractories Co. as assistant divisional superintendent. He had formerly served as district superintendent of the company's Olive Hill, Ky., and Portsmouth, Ohio, works. He has been with the company since 1930.

• **Charles W. Meyers** has been made manager and **Robert D. Knight,** assistant manager, of a newly-formed mechanical spring sales division of the American Steel & Wire Company, Cleveland. Mr. Knight has been with the company since 1932, and Mr. Meyers since 1923.

• **Tinkham Veale, II,** has been named assistant to the president, Ohio Crankshaft Co., Cleveland. Mr. Veale has been with the company since 1942, serving for the past three years as manufacturing and administrative head of the company's Tocco Div.

• **Jack A. Cairns,** formerly assistant to the western division sales manager of the Hyster Co., Portland, Ore., has been transferred to a sales engineering position in the Los Angeles area. Mr. Cairns has been with Hyster for the past 4½ years. **William Kilkenny** has been appointed district manager of industrial truck sales in the western division of Hyster at Portland. Mr. Kilkenny assumes his new position after more than 2 years as a salesman for Hyster Sales Co., Portland.

• **John Hood** has retired as manager of the Oakland, Calif., works of the Apparatus Dept., General Electric Co., after serving 25 years with the company. He has been succeeded by **Ab Martin,** who has served as assistant manager for the past year.

• **Hugh J. Pugsley** has been elected vice-president of the combustion furnace division of Swindell-Dressler Corp., Pittsburgh. Mr. Pugsley has served the company 22 years in engineering and sales.

• **Hugo W. Jones** has been appointed assistant sales manager of Adamas Carbide Corp., Harrison, N. J. Mr. Jones had previously been associated with Tungsten Electric Corp. and Westinghouse Electric Corp.

• **Thura A. Engstrom** has been named executive vice-president and **Frederick H. Faust,** secretary, Continental Motors Corp., Muskegon, Mich. Mr. Engstrom joined Continental in 1925. He was elected vice-president and factory manager of the Muskegon division in 1947. More recently he has been works manager for the aircraft, automotive and industrial engine divisions. Mr. Faust joined Continental in 1935 and was elected assistant secretary in 1939. **Lewis P. Kalb,** director, has been elected vice-president, devoting full time to Gray Marine Motor Co., a Continental subsidiary. **William G. Raven** has been elected vice-president of Continental Aviation and Engineering Corp.

• **Norman E. Olds** has retired as advertising manager of Perfection Stove Co., Cleveland, effective May 15. Mr. Olds has been connected with Perfection 30 years, serving as sales manager of the Canadian branch for 5 years before becoming advertising manager.

• **Ambrose J. Seitz** has been elected executive vice-president of the Union Pacific Railroad. Mr. Seitz, who had formerly served as vice-president of traffic, has been succeeded by **William T. Burns. James R. MacAnally** has been named general freight traffic manager succeeding Mr. Burns and **Norman B. Marvin** has been promoted to assistant freight traffic manager. Mr. Marvin had formerly been assistant to the traffic vice-president. **John Gogerty** has retired as general superintendent of motive power and machinery at Omaha. Mr. Gogerty began his railroad career 50 years ago and has been with Union Pacific since 1918.

• C. J. **Hendryx** has retired as sales supervisor of the southeastern states and branch manager at Atlanta for E. C. Atkins & Co., Indianapolis. Mr. Hendryx has been with Atkins since 1899. **Jay W. Pickett** has been named district sales manager of the southeastern district with headquarters in Atlanta. He joined Atkins in 1919 and since 1940 has been associated with the sales force.

PHILIP FINALE, chief engineer, Loewy Construction Co., Inc.

• **Philip Finale,** formerly rolling mill department engineer, Mesta Machine Co., has joined Loewy Construction Co., Inc., rolling mill division of Hydropress, Inc., New York, as chief engineer.

• **G. W. Thompson** and **Joseph P. Loftus** have been named field managers, Mr. Thompson in Dallas and Mr. Loftus in New York district, for the Associated Lines division of the B. F. Goodrich Co., Akron. Mr. Thompson had formerly been territory manager for the division in Minneapolis. Mr. Loftus had been a budget supervisor in New England. **T. C. Culver** has been appointed representative for Hycar and rubber chemicals for the B. F. Goodrich Chemical Co. Mr. Culver has been with Goodrich since 1940 and had previously been engaged in sales development work. **Charles L. Campbell,** manager of the Philadelphia district of the Replacement Tire Sales division of Goodrich since 1936, has been named sales development manager of the eastern division. Mr. Campbell is succeeded in Philadelphia by **L. O. Veith,** who for the past two years has been manager of the company's Harrisburg, Pa., store.

• **William C. Little,** for many years Detroit district manager for the Bearings Co. of America, Lancaster, Pa., has resigned from the company.

JAMES G. KENNEDY, vice-president, Redmond Co., Inc.

• **James G. Kennedy** has been promoted to vice-president in charge of production of the Redmond Co., Inc., Owosso, Mich. He has been with the company since 1944 and had previously served as production manager. **Paul Maurer** has been named vice-president in charge of engineering, being advanced from director of engineering. He joined Redmond in 1943. **Paul B. Best, Jr.** has been made vice-president in charge of series motor sales. He has been with the company since 1939. **James Tweedy,** new vice-president in charge of induction motor sales, has been with the company since 1943. **Wilfred R. Fox** joined Redmond in 1944 and in addition to his appointment as vice-president, has recently been named manager of advertising and marketing research for Holtzer-Cabot, Inc., an affiliate in Boston. **W. Walter Young** has been made comptroller-treasurer, having previously served as comptroller.

• **Stanley B. Koch** has been appointed sales manager of the Merit Shearing Co., a Chicago warehouse.

• **Carroll E. Burton,** purchasing agent of the Farrell-Birmingham Co., Ansonia, Conn., for the past 35 years, has retired. **Harry F. Williams,** formerly assistant purchasing agent, has been named to succeed Mr. Burton.

W. RONALD MORSE (left), and HAROLD E. PAPE (right), vice-presidents, The Stanley Works.

• **W. Ronald Morse,** formerly plant superintendent, has been named vice-president in charge of the Hardware Div. and **Harold E. Pape** has been named vice-president in charge of the Steel Div., the Stanley Works, New Britain, Conn., succeeding **Patrick F. King** and **Maurice H. Pease,** respectively, who have withdrawn from active managerial duties and now serve in advisory capacities. **Raymond C. Ball** has been elected a director, succeeding **Joseph E. Stone** on the board. Mr. Morse has been with Stanley since 1919. Mr. Pape has been connected with Stanley since 1926 when that company bought the American Tube & Stamping Co., with which division he has recently served as purchasing agent. **C. J. Diemand** has been appointed general manager of the steel plant in Bridgeport.

• **Jerome Sabel** has been appointed to the sales force of E. H. Fairchild, Chicago, representatives for Automatic Transportation Co. Mr. Sabel covers Louisiana and Mississippi for the company, with headquarters in New Orleans.

• **Donald S. Grubbs** has been appointed manager of the California division of the Oil Well Supply Co. at Los Angeles. **Warner F. Parker** has been named sales manager of the division.

• **George M. Hartley** has been appointed materials engineer for the chemicals division of the Chemical Dept., General Electric Co., Pittsfield, Mass. Mr. Hartley joined GE in 1946 and in 1948 was named supervisor of community relations and planning for the Chemical department's employee relations division.

• **Robert C. Hoffman** has been transferred from industrial engineer to Chicago distributor sales representative for the radio division of Sylvania Electric Products, Inc. Mr. Hoffman has been with Sylvania since 1947 when he joined the industrial engineering staff at Emporium, Pa.

• **Frank Rippingille,** for the last 12 years with the research division of General Motors, has been appointed to the staff of the vice-president in charge of engineering for Clark Equipment Co., Buchanan, Mich.

• **John C. Mertz** has assumed the post of materials engineer of Pratt & Whitney Aircraft Div., United Aircraft Corp., East Hartford, Conn., succeeding **Gordon T. Williams,** who died. **Winston H. Sharp** has been appointed engineering metallurgist, assuming the responsibilities relinquished by Dr. Mertz.

• **Paul B. Hill** has been named sales representative in the Greenville, Miss., territory for Southern States Iron Roofing Co., replacing **J. W. Shaw,** who resigned. Mr. Hill has been with the company since 1948 as sales representative.

• **David M. Nason** has joined the New Holland Machine Co., New Holland, Pa., as assistant purchasing agent. He had formerly been associated with F. J. Stokes Machine Co., Westinghouse Electric and the New England Mutual Life Insurance Co.

• **Fred A. Kaufman** has been appointed sales manager of the Electrode division of the McKay Co., York, Pa. Mr. Kaufman had previously served as chief metallurgical engineer, and before becoming associated with the McKay Co. in 1947, he did research in arc-welding on the McKay fellowship at Mellon Institute and had served as metallurgical engineer with Carnegie-Illinois Steel Corp.

• **R. E. Valk** has been made works manager of the Toledo plant of National Supply Co., Pittsburgh, succeeding **L. A. Ringman,** who has resigned. Mr. Valk became associated with National Supply in 1938, becoming assistant works manager in Toledo last year.

• **H. P. Niemann** has been elected president of Hertner Electric Co., Cleveland, succeeding **C. C. Dash,** who has retired after 30 years with the company. Mr. Niemann had previously served as vice-president and general manager of the company. **H. P. Sherer,** vice-president and general chief engineer, has been elected a director of the company.

• **D. S. Neuhart** has been appointed general superintendent of motive power and machinery and **A. R. Snyder** has been named general superintendent of that department for the Union Pacific Railroad, with headquarters in Los Angeles. **William H. McCune** has retired as general freight agent at Los Angeles and has been succeeded by **E. C. Rasmussen,** who had previously served as chief clerk in the freight department in Omaha.

• **Howard W. Stephens** has joined the eastern sales organization of the Cold Metal Products Co., Youngstown, with his headquarters in Philadelphia. Mr. Stephens had formerly been connected with Wheeling Steel Corp.

• **Cecil B. Roberts,** sales representative for Pennsylvania Salt Mfg. Co., Philadelphia, in the B-K division in southwestern United States for the last eight years, has been named a product supervisor of the division. Mr. Roberts has his headquarters in Oklahoma City.

• **Harlow Scott** has been named purchasing agent of Pratt & Letchworth Co., Inc., Buffalo, succeeding Paul J. Houck, Sr., who died. Mr. Scott has been assistant purchasing agent for several years.

• **Frank J. Grunder** has been appointed sales manager of the R. C. Neal Co., Inc., Buffalo. He joined the Neal organization more than a year ago as assistant sales manager.

• **Ray C. Haimbaugh,** director of engineering, has been named manager of the North Tonawanda division of the Rudolph Wurlitzer Co., Chicago, succeeding **Carl E. Johnson,** who resigned as vice-president and division manager.

• **Walter H. Ferguson,** formerly executive vice-president of the National Mfg. Corp., Tonawanda, N. Y., has been elected president of the newly-organized Weatherpanel Sidings, Inc.

• **Robert C. Seaton** has been named manager of the sales branch in Richmond, Va., of National Radiator Co., Johnstown, Pa., succeeding **William E. Austin,** who has retired. Mr. Seaton has been with the company since 1934 and became a salesman for the company in 1945. Mr. Austin has been associated with the company for the past 35 years.

• H. E. **Leilich,** formerly mechanical engineer and power plant project manager for Rust Engineering Co., has joined the staff of the Peter F. Loftus Corp., Pittsburgh.

BYRON E. RHOADS (left), and HOWARD H. STURDY (right), vice-presidents, Dravo Corp.

• **Gordon W. Cameron,** treasurer, Aluminum Co. of America; **Louis A. Mertz,** vice-president and treasurer of Dravo Corp., and **Howard H. Sturdy,** general manager of Dravo's contracting division, have been elected directors of the Dravo Corp., Pittsburgh. Mr. Sturdy and **Byron E. Rhoads,** chief engineer of Dravo's contracting division, have been named vice-presidents. Mr. Sturdy started as a field engineer with the company in 1936 and Mr. Rhoads joined Dravo in 1923.

• **J. B. Neiman** has resigned as general manager of Federated Metals division, American Smelting & Refining Co., Detroit, effective June 1. Mr. Neiman has been with Federated Metals and its predecessors in various executive capacities since 1911.

• **Frank I. DeCavitte** has been appointed factory manager of the Plymouth plant of the Chrysler Corp. in Detroit. **George H. Rumford, Jr.,** superintendent of the Evansville, Ind., plant, has been promoted to plant manager there, succeeding Mr. DeCavitte. **R. H. Dungan** has been named factory manager of the New Castle, Ind., plant of Chrysler, succeeding **W. G. Helber,** who has retired. Mr. Dungan has been with Chrysler and its predecessors for the last 39 years.

(CONTINUED ON PAGE 142)

OBITUARY...

• **McMillan Robinson,** 38, sales manager, Metal Products Div., Koppers Co. Inc., died April 4.

• **William C. Mattison,** 41, secretary, Woodstock Slag Corp., Birmingham, died April 2.

• **Samuel O. Hobart, Sr.,** 70, retired industrialist and an expert in the mining of iron ores and in the production of pig iron, died April 8. He had been associated with Republic Steel Corp., Troy Furnace Corp. and National Lead Co.

• **Raymond N. McAdams,** 65, former secretary of Hercules Powder Co., Wilmington, Del., died April 9.

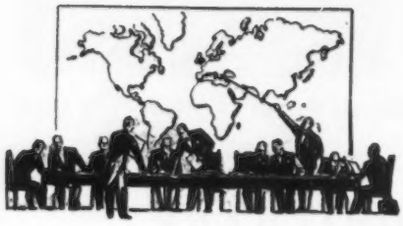
• **Harry M. Hooker,** 76, former president and chairman of the board of Hooker Electrochemical Co., Niagara Falls, N. Y., died April 9.

• **Curtis S. Garner,** 72, former vice-president of American Bridge Co., Pittsburgh, died April 11.

• **Walter F. Welsh,** 57, sales engineer, Bigelow-Liptak Corp., Detroit, died recently.

European Letter . . .

• All weapons science provides will be used in waging future wars . . . Atomic bomb Atlantic Pact nations defense factor . . . Public should have correct knowledge of bomb's capacities and limitations



LONDON—President Truman has now made it clear that he will not hesitate to use the atomic bomb in any future war in defense of the United States and its allies. In a press conference on April 6, he referred to his decision to use it against Japan in July, 1945, and said:

> Now I believe that we are in a position where we will never have to make that decision again, but if it has to be made for the welfare of the United States, and the democracies of the world are at stake, I wouldn't hesitate to make it again.

Just before the President's statement Mr. Churchill, in his speech to the Massachusetts Institute of Technology, had declared that only America's exclusive possession of this weapon had stood between Britain and Russian aggression in the postwar period. These statements go beyond anything previously said by such eminent personalties in accepting reliance on the atomic weapon as a means of defense against the new totalitarian threat from the east. The existence of the bomb and the continued American stockpiling of it have, of course, been recognized as factors of power in the background of world politics ever since the weapon was first used in 1945. But, as long as there was any hope of a convention for international control of atomic energy, mankind was unwilling to resign itself to the inclusion of these terrible weapons in the armories of nations. Only since the final deadlock in the negotiations for international control has it come to be taken for granted that the atomic bomb will be used in any future war among the Great Powers. President Truman's declaration is merely an official American claim of the right to use it and a warning that it would be used. Russia has made no such declaration on the subject; but nobody doubts that Russia will be willing to use it whenever Russian industry shall have produced it.

Such being the situation today, it is important for the general public in the western democracies to have a reasonably correct idea both of the capacities and limitations of the atomic bomb as a means of warfare. It is essential neither to overestimate nor to underestimate its effectiveness. In its actual use against Hiroshima and Nagasaki, and in the tests in the Bikini lagoon, conditions were not analogous to those which would probably exist in a future war, particularly one in which both sides possessed the bomb. So there is necessarily room for wide differences of opinion, even among military experts, about its military value; and the secrecy which envelops all research, both on methods of using atomic weapons and on counter-measures against them, naturally introduces great uncertainty into all forecasts.

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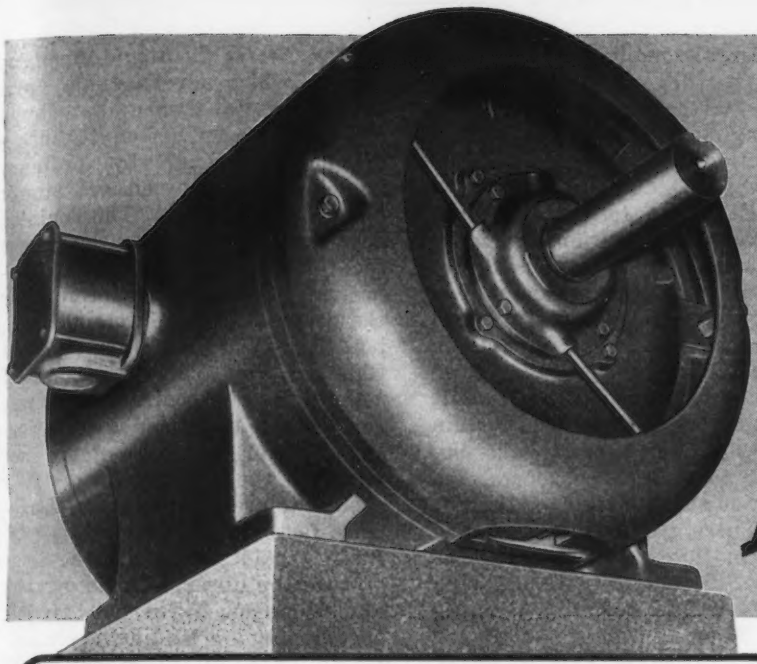
Nevertheless,there are some general propositions which can be stated with a high degree of assurance, and which are relevant to any rational discussion of world politics at the present time.

IN the first place, there is no ground for regarding the atomic bomb as the absolute weapon which can be used to knock out a great power by means of a sudden overwhelming attack. If a nation has a large territory, with industries and population well dispersed, if its military and naval forces are not excessively concentrated, if it has a good system of interception against bombers and if it maintains reasonable vigilance, the chances of deciding a major war by a single initial blow are virtually nil. Both the United States and the Soviet Union are territorially so vast that not even the most recent inventions of modern science could cover either with destruction in a merely aerial *Blitzkrieg;* and in neither case could there be a rapid military followup, America being protected by the intervening ocean and Russia by the inferiority of opposing land forces on the European continent. The idea of an "atomic Pearl Harbor" has little to sustain it, because the situation in which the naval power of the west depended on eight capital ships lined up in a small land-locked bay is extremely unlikely to recur. If the Bikini tests have not brought home to naval staffs the paramount importance of dispersal of fleets, one might as well cancel all defense expenditure straight away and resign oneself at once to the extinction of western civilization by the heirs of Ivan the Terrible. But there is reason to believe that the naval authorities of both Britain and the United States are now aware that the sea is a large place.

Nevertheless, there is this unpleasant fact to be faced that, if there is a country which, by its small size, concentration of urban areas and accessibility to bomber attack, is specially vulnerable to atomic aggression, it is certainly Britain. This is a fact which should induce us to consider carefully all town and country planning in relation to civil defense, and to take all precautions compatible with the basic need for national solvency. It is certainly not a reason for despairing pessimism, and still less can it justify panic-stricken attempts to escape from international commitments into a fool's paradise of neutrality in world conflicts. The only security for this country lies in the Atlantic Pact, in a defensive alliance with countries which by their size and geographical position do not share Britain's vulnerability and therefore forbid a European aggressor to hope for decisive victory by a sudden attack. A totalitarian power in Europe, which knows it has to reckon with North America, will be less tempted by the seductive thought of obtaining mastery of an isolated Europe by a surprise onslaught on half a dozen British cities.



Wagner
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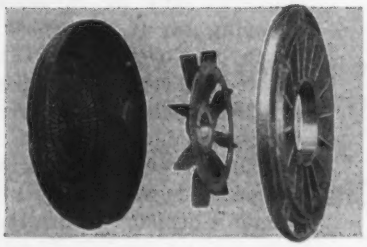
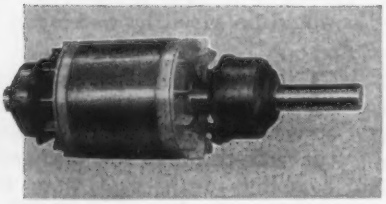
here's the Inside Story!



Fan shield, which protects externally mounted, non-ferrous ventilating fan; and front endplate, ribbed for mechanical strength.



Cast aluminum rotor with cartridge-type ball bearings.

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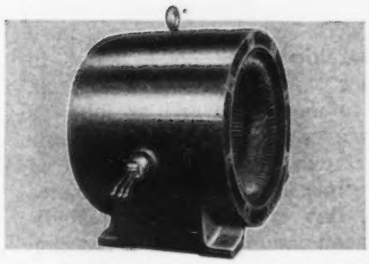
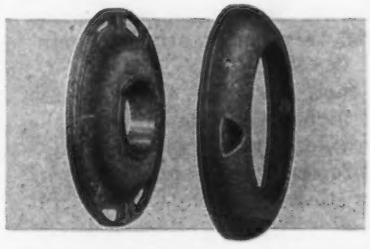
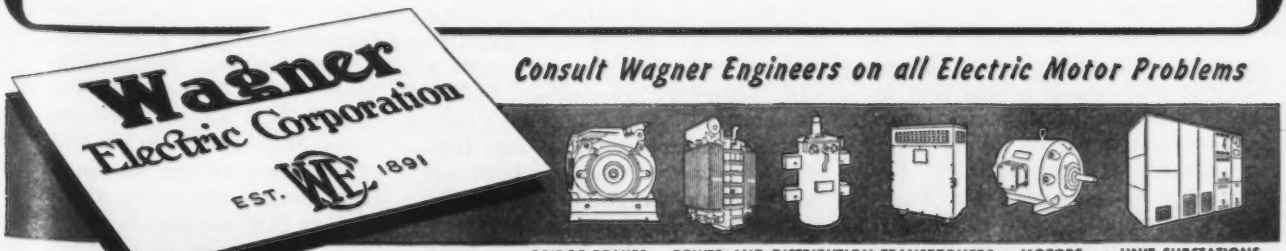


Wound stator, showing extra large air ducts.



Back endplate, and shield which directs ventilating air so that it cools the drive-end bearing.

Consult Wagner Engineers on all Electric Motor Problems



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ELECTRICAL EQUIPMENT AND AUTOMOTIVE BRAKE PRODUCTS

THE limitation of the capacity of the atomic bomb to decide a major war apart from naval and military operations cuts both ways. It gives the west reassurances against the fear of being wiped out overnight by unheralded aggression; but at the same time it condemns any idea of forcing a showdown with Russia on the assumption that, in a crisis, Russia could be forced to capitulate by atomic bombing. The value of the bomb to the Atlantic Pact nations is of a different kind; it is fundamentally defensive, even though its mode of operation would be offensive. It is a factor which in war would be one of relentless attrition and may therefore be expected in peace time to function as a deterrent. Russia undoubtedly has at present a continental military ascendancy, both in Europe and Asia, and will probably retain it, though the margin may be considerably reduced by the rearmament of the west and the strengthening of the defensive capacity of certain countries which remain outside the Soviet orbit. This military superiority is bound to produce, in a dictatorship based on a belief in violence as the *ultima ratio*, an urge to move forward as long as such moves can apparently be made with impunity to the homeland of the regime. But if military advance to the Bay of Biscay or the Mediterranean cannot provide protection against terrible aerial retaliation, if the price to be paid for military conquest is a shattering devastation of homeland industry, then the temptation to launch aggressive war is very substantially diminished.

In fact then the atomic bomb would appear to compensate the western democracies for their present inferiority of land forces by giving them the capacity to hit back effectively at Russia if its military power is used aggressively against them or their allies. It may be said that this advantage will be cancelled as soon as Russia possesses atomic bombs—if it has not got them already. But, even if it be assumed that the United States will not still retain a long lead in the technical side of atomic warfare—which would be a very large assumption—the geographical distribution of potential air bases would continue to give the Americans a decisive advantage for strategic bombing. Moreover, even if the aggressor himself has atomic bombs, it still remains true that he cannot start a major war without bringing immediate and terrible destruction on his own people.

THE factors to be taken into account by governments in any preparations for a possible future war are not, however, only of a strategic order. In the western democracies, where public opinion is free to express itself on moral issues, a widespread belief that it is morally wrong to use certain means of warfare can have important political consequences, and may even affect morale in time of war. There are undoubtedly many people in this country and in the United States who, without being pacifists in the sense of rejecting the right of a nation to wage war against an aggressor, consider the use of such a weapon as the atomic bomb morally wrong in any circumstances. In the United States a campaign of moral reprobation of atomic armaments has been led by Dr. Robert Hutchins, Chancellor of Chicago University, who speaks of the moral cloud hanging over America as a result of the use of the bomb against Japan in 1945. The sense of guilt which is thus fostered, and is vigorously exploited by the Communists to create confusion and misgivings about the whole of American foreign policy, is accentuated by a distorted version of the motives which led President Truman to authorize the use of the bomb against Japan, a version given wide currency on this side of the Atlantic by the polemics of Professor Blackett.

According to this account, the claim that it was used in order to avert the heavy American casualties expected to be incurred in an invasion of Japan is false. The real reason for using it, it is argued, was to forestall a Russian victory over Japan and gain for the United States that exclusive postwar control of Japan which has in fact come about. If this version of events is true, the motives for using the bomb were not military but diplomatic, and the idea that such a vast slaughter of human beings was ordered by an American President for any reason less than that of winning the war without an even greater slaughter is naturally repugnant to any normal conscience. But the whole story has been built upon the special pleading of the *United States Strategic Bombing Survey*, which advertises the opinion of certain airmen that Japan could have been driven to unconditional surrender by ordinary bombing without either atomic bombs or invasion. This opinion does not correspond to the known facts of the Japanese political situation in August, 1945: even after the dropping of the atomic bombs, both the War Minister and the Chief of the Army General Staff were in favor of continuing the war rather than surrender unconditionally; but for the shock of the new weapon, the Army was strong enough to prevent the peace-at-any-price faction from getting its way. Russia could not decide the issue of war; the Russians could overrun Manchuria and Korea, but they had no shipping or landing craft sufficient for an overseas invasion of Japan itself, where alone surrender could be enforced. In any case, whatever opinions may now be about what might have happened, the American military leaders believed then that Japan could be conquered only by invasion, were preparing for it (Japanese D-Day was to be November 1, 1945) and expected the cost in casualties to be very high. There is no ground for any reasonable person to believe that any other consideration than this carried weight in President Truman's decision to use the bomb. As he said on April 6: "I made that decision because I thought 200,000 of our young men would be saved by making that decision, and some 300,000 or 400,000 of the enemy would be saved by making it."

THE atomic bomb is an appalling instrument of mass destruction. But appalling also was the devastation of so-called ordinary bombing in the last war; and if civilian casualties are to be the test, it is well to remember that the great raid of May 15, 1945, on Tokyo, carried out with high explosives and incendiaries only, caused a higher death toll than the atomic bomb on Hiroshima. The atomic bomb is simply the most frightful kind of bomb. All bombs are frightful enough, and nobody seriously supposes that great cities will ever again in any future war be secured from aerial attack by nineteenth-century international law, any more than it can now be expected that submarines will warn ships.

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Cumberland Brand—30,000 lb per sq in.
Potomac Brand—45,000 lb per sq in.
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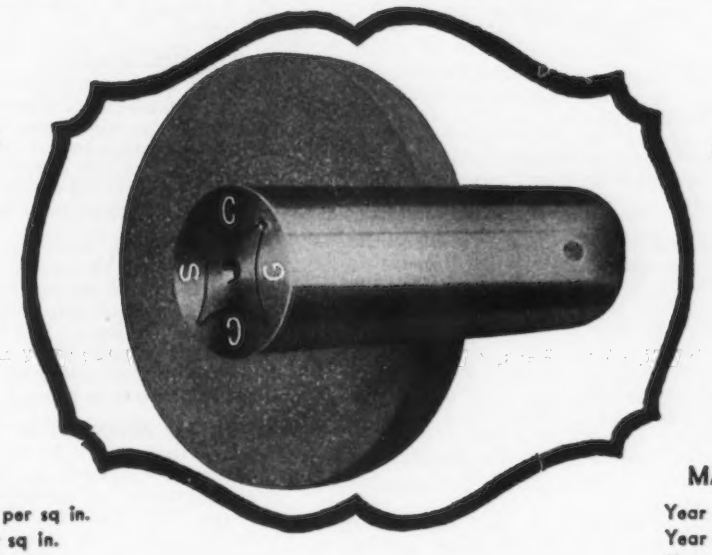

CONCENTRIC STRAIGHT ACCURATE

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MAXIMUM LENGTHS MANUFACTURED

Year 1845—up to 16 feet
Year 1886—up to 25 feet
Year 1945—up to 70 feet

They are carefully ground to our standard manufacturing tolerance, plus nothing to minus .002" on diameters 1-1/8" to 2-7/16" inclusive . . . plus nothing to minus .003" on diameters 2-1/2" to 8" inclusive. Closer tolerance can be furnished, if desired.

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CUMBERLAND STEEL COMPANY

CUMBERLAND, MARYLAND, U. S. A.
ESTABLISHED 1845 INCORPORATED 1912

• **BAD TIMING**—The Bureau of Mines inquiry to all scrap yards, the trade believes, is ill timed. Nor do dealers believe it will give the bureau the information which it seeks. They point out that detailed operations from January to March will not be indicative of average scrap yard operations. Dealers have only 10 days to return the form which they report is essentially the same as the one they received shortly after Pearl Harbor.

• **PIG IRON FOR JAPAN**—On Apr. 13 the Procurement Office of the Corps of Engineers in Chicago submitted the bids received on the 60,000 tons of pig iron they are buying for Japan. Twenty-five separate bids were received, Colonel Medding, Chicago procurement officer, told THE IRON AGE. Prices including cost and freight to Japan varied from $55.75 to about $80.00 a ton.

• **BUYS FIRM**—Advance Die & Tool Co., Cleveland, has purchased the fixed assets and inventory of Bunell Machine & Tool Co., Cleveland, Richard Bredenbeck, Advance president, revealed this week. Consideration involved was reported to be $500,000. The new owners took possession Apr. 14.

• **RUSSIAN ORES**—American imports of Russian manganese and chrome ores amounted to $1.3 million in February. While this is a slight increase over the $1.2 million figure for January, it is still under the 1948 monthly average of $1.9 million.

• **GALVANIZED CUT**—Reductions in galvanized sheet extras averaging $1.50 per ton were automatically put into effect by Carnegie-Illinois and other sheet producers last week following the zinc price cut. Galvanized pipe makers also adjusted discounts to lower prices by $2.00 a ton.

• **PIPE EXPORT**—Office of International Trade has approved a license to Trans-Arabian Pipeline Co. for export of 35,000 tons of 30-in. welded line pipe. This action brings the total amount of pipe thus far authorized for this line to 114,000 tons.

• **REDUCES PRICES**—Allis-Chalmers Mfg. Co., Milwaukee, has announced price reductions of from 7 to 19 pct effective Apr. 11, on their multiple V-belt drives.

• **MOTORS CUT**—General Electric has reduced prices from 3 to 14 pct on standard sump-pump motors, oil-burner motors, belt-drive motors and some jet-pump motors.

• **OUT OF BLAST**—Early in April Pittsburgh Steel Co. stopped operation of its No. 2 blast furnace at Monessen. This week it was learned that the No. 1 furnace had also been taken out of blast. No. 3 furnace, purchased from Defense Plant Corp., can supply the company with all the iron it needs for full steelmaking requirements. Capacity of No. 3 furnace is about the same as that of the other two combined.

• **TUBING**—Pittsburgh Steel Co. last week adjusted prices of oil country tubular products to bring them into line with competitive quotations. Supply of pipe and tubular products is still somewhat tight. The reason for getting items like these into line today is because most of them are arranged for some months ahead and any producer that wants to be included in buying plans can't risk waiting until supply tops demand in order to book business.

• **BARS**—Some sizes and grades of hot-rolled bars are soft as butter. Though one of the big midwestern mills is almost a month behind on deliveries, some others are so current that they can ship small sizes in standard grades in a matter of weeks. As far as most grades are concerned cold-finishers have taken all the pressure off their suppliers and, like the hot-rolled salesmen, they are battling to hold what tonnage they have on the books.

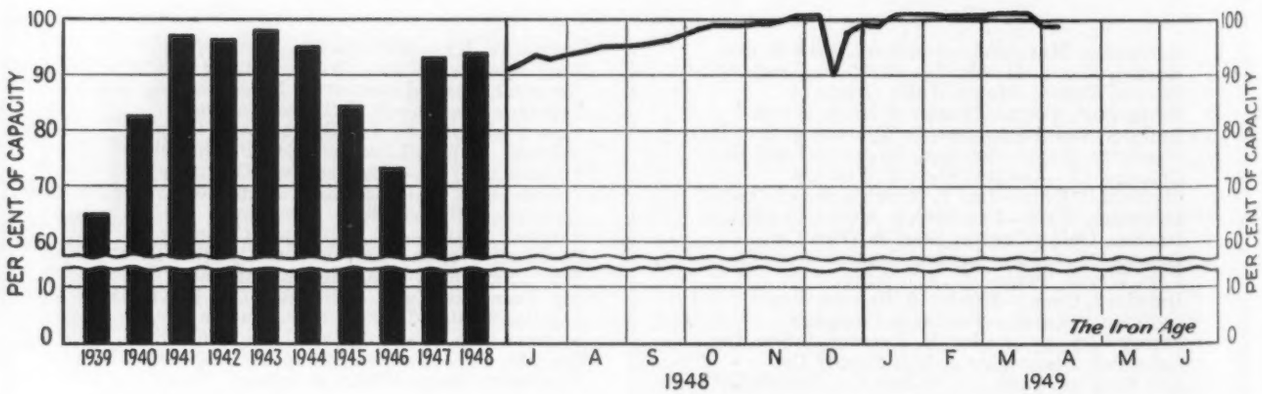
• **SHEET AND STRIP EASING**—Supplies of sheet and strip are easing fast in the Midwest. Generally mill carryovers have vanished and shipments are practically current with promises. An exception is one midwestern mill whose average carryover on most products is 2 weeks. Byproducts, galvanized sheets and some plates are the only exceptions to this current delivery.

• **PIG IRON PRICES**—Hanna Furnace Corp .has reduced pig iron prices to equalize with competitive furnaces. Its action, effective immediately, also re-established, the 50¢ price spread between basic and foundry iron at Buffalo. The new prices are: Basic, $46.00; No. 2 foundry, $46.50; and malleable, $47.00.

• **FIRST SINCE '39**—The Electro-Motive Div. of General Motors has made the first general price reduction on diesel-electric locomotives the industry has seen since 1939. The reduction amounts to about 5 pct and is effective immediately.

• **CUTS PLATES**—Effective Apr. 18, Lukens Steel Co. has cut the price of carbon steel plates from $3.75 per 100 lb to $3.50 per 100 lb. This is a reduction of $5 per ton f.o.b. Coatesville, Pa.

Steel Ingot Production by Districts and Per Cent of Capacity



Week of	Pittsburgh	Chicago	Youngstown	Philadelphia	Cleveland	Buffalo	Wheeling	South	Detroit	West	Ohio River	St. Louis	East	Aggregate
April 12.....	101.0	101.0*	94.5	98.0	98.5*	105.0	102.0	94.0	107.0*	100.0	103.0	84.5	86.5	98.5
April 19.....	101.0	101.0	94.5	98.0	104.5	105.0	102.0	94.0	100.5	100.5	103.0	84.5	85.0	99.0

* Revised.

Industrial News Summary

- ***Steel Customers Hesitating***
- ***Blanket Orders Showing Up***
- ***Scrap Down 83¢ a Gross Ton***

STEEL customers this week are playing the "Hesitation Waltz" with steelmakers. In some cases it is almost the refrain "Waltz Me Around Again, Willie." Six months ago steel consumers were knocking at steel firms' doors for future steel. Now steel companies are trying to get many of their customers to make up their minds how much steel they will want for the third quarter. They are not having too much luck.

This week the steel shortage is definitely over. Many products are in general balance with demand. Some items will soon be in better supply than the demand for them. So strong is this trend to normal methods of buying steel that at least two steel firms have started to take blanket orders from customers. A blanket order (prewar style) is an order for general requirements for a long period. Specifications against these blanket orders come through at a later date. This is a sure sign that the inflationary bloom is off steel.

Other steel firms which had been hesitant about taking a flock of orders for future delivery are changing their minds quickly. Steel firms for the past several years have been able to schedule far ahead and make economical production runs. Now that many customers are holding off telling their suppliers what they want in the third quarter it means that steel salesmen will have their hands full. First, they will have to keep after their regular customers and second, they will have to keep a close watch on their competitors. If they don't, a juicy account might be lost. It happened that way in prewar years.

Steel users have one eye on their inventories and the other on the general economic outlook. Their reaction is anything but placid. Knowing full well that ECA has been approved, that Western Europe will be rearmed and that there may be steel losses due to a long coal strike; they still, this week, act as if they will decide to go slowly on future steel commitments.

THIS deadpan look of steel customers is something new for many steel sales people. For others it recalls the days when both the customer and the steel competitor had to be watched with an eagle eye. Those days are here this week. A few large steel companies had important sales conferences late last week. They did not talk about the weather. They had plenty to discuss about future trends.

A few things they could have talked about are: (1) The increase in cancellations. (2) the slow leveling off in new orders, (3) the downward trend in railroad buying, (4) the heavy slashes in appliance manufacture, (5) the hesitancy in farm area buying with its lowered income, (6) the chances of auto companies to hold up their unprecedented buying of steel in the face of the general business outlook, and (7) the impact of capacity operations in the past 3 months on current steel demand.

In the auto industry this week there are no signs that any steel shortage is bothering this major prop of the steel industry in normal times. In some cases auto makers are refusing to supply their partsmakers with steel. They have been told to "get it themselves." In another case a large partsmaker has received heavy cancellations from an auto maker. All this means that steel is no longer the No. 1 national shortage scarehead.

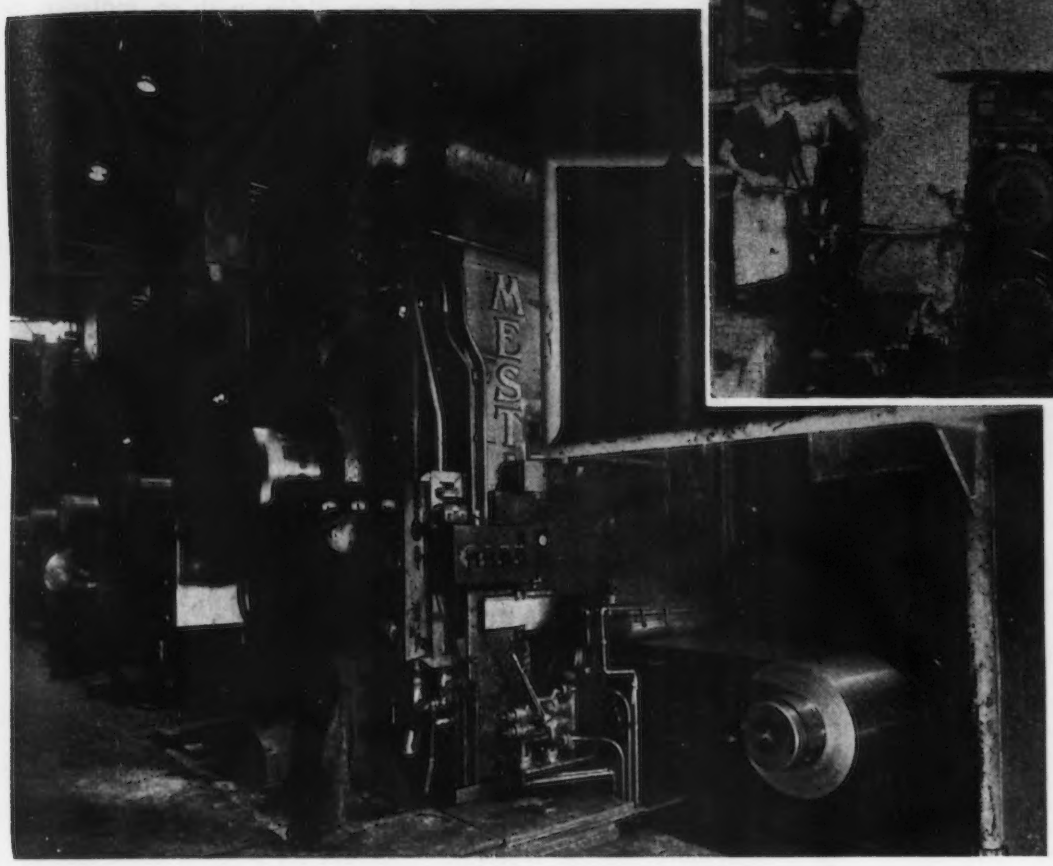
Conditions this week in steel will make unhappy reading for those in Washington who insist on more capacity and more production. From here on out the law of supply and demand will rule the ingot rate and not "long term" trend charts made up in Washington by those whose predictions on the steel shortage just have not come true.

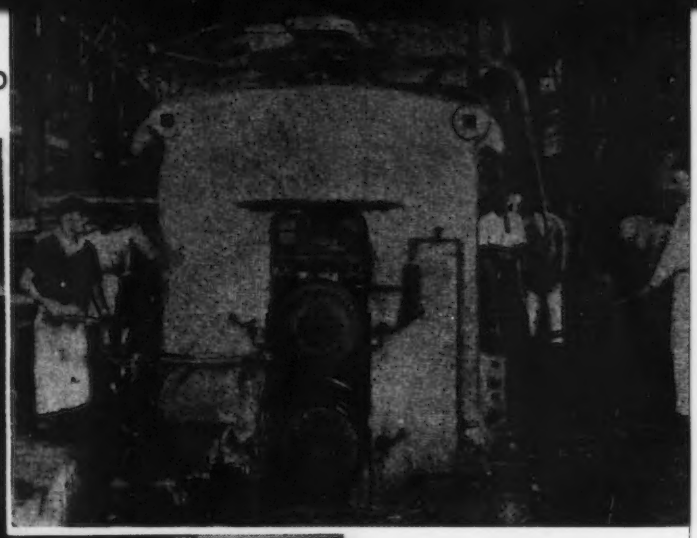
THERE is no sign in the industry this week that the ingot rate is ready to go to pot. The rate this week is off one-half a point to 99 pct. Present operations, however, are reflecting orders placed some time ago. They are no indication of what is to come.

In most cases steel firms have been just as anxious as manufacturers to turn their backlogs into shipments—which mean cash. The outlook in steel foreshadows a return to stiff competition and a beating of the bushes for orders.

The scrap market was still weak this week. The trend was still down, although not as sharply as it had been. There was no change in No. 1 heavy melting at Pittsburgh, but at Philadelphia it was off $1.50, and at Chicago the drop was $1 a gross ton. THE IRON AGE scrap steel composite this week is off 83¢ a gross ton to $22.75 a gross ton. There is no indication when the leveling off in scrap will be completed. Buying is nothing to write home about.

There is more evidence this week that steel shipments by barge and truck are increasing at the expense of the railroads. This condition supplies part of the answer on how steel customers are trying to make up for the disadvantages of the f.o.b. mill setup. Truck and barge rates are much cheaper than railroad rates.





OLD AND NEW: *The old hand mill (above) is on its way out. The modern continuous mill (left) bats out carbon steel sheets at the rate of 60 mpr. It makes a better product at a lower cost.*

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Hand Mills Face Foreclosure of War-Induced Lease on Life

Non-Integrated Sheet Mills Find Wartime and Prewar Advantage Slipping

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By GEORGE F. SULLIVAN
Pittsburgh Regional Editor

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Pittsburgh

• • • For most non-integrated hand sheet mills the 10-year lease on life granted by the war is about to be foreclosed. One or two expect to survive in a steel buyers' market by producing fabricated products, another hopes to be able to stay in business by making non-competitive specialty products. But the days when their standard product, a light gage hot-rolled annealed sheet, could keep the non-integrated hand mill in business are numbered.

For most purposes a cold-rolled sheet is a better and cheaper product than the hot-rolled article. Even before the war most hand mills existed only because they were able to buy raw material at an artificially low price.

Current mill quotations show the price disadvantage of the hand mill. Hot-rolled annealed sheets, pickled, are now quoted at $4.45 per 100 lb f.o.b. mill. In the same width, 24 in., cold-rolled sheets are $4.20. In 24-gage the hot-rolled pickled sheet costs $4.85 against $4.50 for a 24-gage cold-rolled sheet. The $5 a ton difference becomes $7 in the lighter gage.

True, there are a few applications where the hot-rolled sheet is preferred but in most others the cold-rolled product is specified. Of course, if hot-rolled sheets were cheaper than the continuous mill cold-rolled product they would be used where finish or fabricating properties were not important. But they are not cheaper, and the only way they could become so would be by sharp reductions in labor rates or by an artificially low raw material price. Neither of these are likely possibilities.

The non-integrated hand sheet mills are located in the Ohio Valley. In the past they bought most of their raw material as sheet bars from Carnegie-Illinois, Republic or Jones & Laughlin. At the end of 1945, when Sharon Steel took over the Carnegie-Illinois Farrell Works it was the only source of sheet bars in the area. (Republic had been out of the field for some years and J&L dropped out at the beginning of 1946.)

Since then Sharon has been pro-

ducing sheet bars at Farrell for its own use and has sold them to others on a contract basis. There is no reason to believe that Sharon will stop making sheet bars for sale to others—if there is any market. There is no reason now to believe U. S. Steel will ever reenter this field. Yet Sharon cannot be expected to subsidize competitors of its own Niles Rolling Mill Co.

Hot-rolled coils are available, but an 11-gage strip 24-in. wide now costs $3.50 per 100 lb, or $70 a ton. Steel prices may come down but the relative cost of finished and semifinished steel is not likely to vary much. Meanwhile there are substantially higher freight carges to be paid, no matter what the raw material is.

The hand mill operator who hopes to be able to get a subsidized price on sheet bars, as he did before the war, is going to be disappointed unless the steel business goes completely to pot. Even so, indications are that integrated mills are not likely to "dump" semifinished steel to cut overhead costs when aggressive selling could funnel it through their own finishing departments.

There was a time before the war when costs were not well known, when raw materials appeared inexhaustible, and when certain ore charges continued whether or not the ore was used. Those were the days when U. S. Steel and other producers wet nursed the non-integrated mills, keeping them in business and avoiding charges that big steel was gobbling up its competion. Actually, the low competitive prices set by the industry's continuous mills were strangling marginal producers but for years this fact was overlooked in favor of what amounted to raw material subsidies for the old fashioned mill.

Still rolling carbon steel sheets today are about a score of hand mills. U. S. Steel, Republic, Inland and Sharon operate some. Besides these there are five hand mills operated by other integrated producers, and generally accounting for just a small fraction of these companies' total production. They include: Continental at Kokomo, Empire, International Detrola's Newport Div., Niles, and Portsmouth. The non-integrated list consists of: the Apollo mill of Phoenix-Apollo, Borg-Warner's Superior Sheet Steel Div., General Electric's Mahoning Valley Steel Co., Parkersburg, Reeves, Whitney, and Hudson Motors at Newcastle, Pa.

Whitney Steel's former Chapman Price mill at Indianapolis hasn't run for months. Apollo is up for sale though its management would like to keep it running if it could break even on a good sheet bar price, as an ace in the hole for its stockholders. Reeves' full name tells a lot: Reeves Steel & Mfg. Co. In addition to sheets, it manufactures roofing products, galvanized pails, stove pipe and kindred products.

Mahoning Valley Steel Co., which helped General Electric over the steel scarcity, has, of course, specialized in electrical sheets, as well as in tack plate (sheets for tack making), and in enameling and specialty sheets.

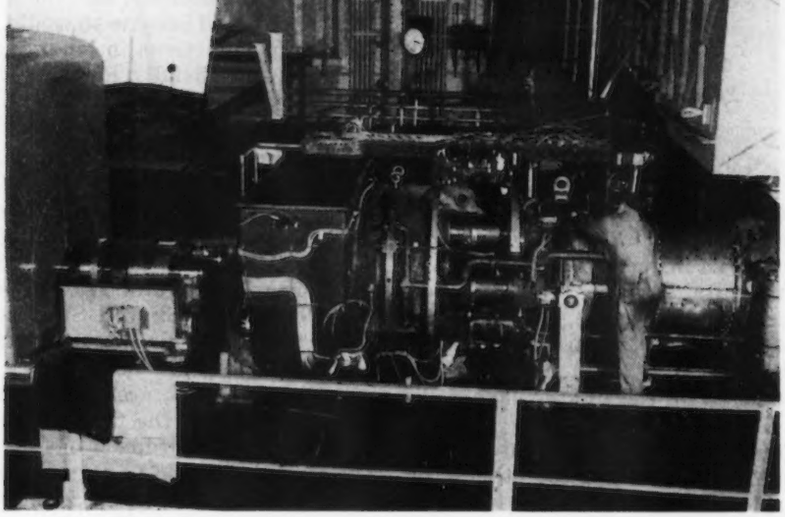
Parkersburg hopes to be able to stay in business by putting emphasis on manufacturing. Today it makes drip pans, stove pipe and other formed products. Like some other hand mills it plans to go after the small order that is now considered uneconomical by the big mills.

In summary, integration from the sheet bar or hot-rolled coil to the finished product may be the answer for some of these non-integrated mills. Those counting on the small order or specialty product may find that big mills welcome small orders when business is bad.

Some of the hand mill divisions of the integrated producers are better situated. Assured of raw materials which can be charged in at little or no profit, and fitted with modern accessories, they can do quite well if they have a balanced list of well situated customers in diversified industries and operate under a sound capital structure with low sales and administrative overhead.

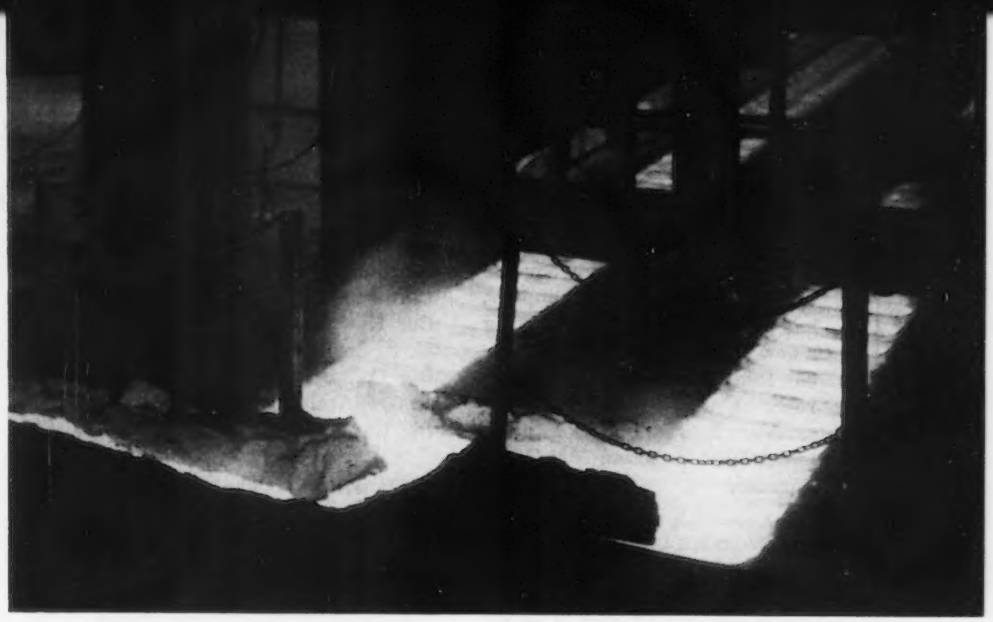
As for the carbon steel hand mills of the integrated steel companies, they are on their way out fast. U. S. Steel is a case in point. It operates such mills today only at Gary, Vandergrift, Pa.; Fairfield, Ala., and Torrance, Calif. The Gary mills will be dismantled by July 1 when revamping of the continuous mill should be completed. The hand sheet mills at Tennessee Coal, Iron & R. R. Co., Fairfield, will be supplanted by a cold mill later this year. At Torrance they'll go when the new cold reducing mill is built there.

FIRST GAS TURBINE: *The first combustion gas turbine power plant to be built and sold in this country for central station use is shown as it was on test at the General Electric Co. plant in Schenectady. The unit is rated at 3500 kw.*



NEWS OF INDUSTRY

Pig Iron Producers Face Declines In Demand, Prices



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By BILL LLOYD
Cleveland Regional Editor

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Cleveland

• • • **Declining demand** and severe price testing, a couple of prewar hussies in postwar dress, were pestering the merchant iron industry this week for the first time since 1937.

A 30 pct drop in merchant iron demand during the past 2 months and a general liquidation of inventories by foundry and malleable iron consumers whose order backlogs for castings have also been disappearing rapidly have brought the situation into sharp focus.

Producers frankly admit the outlook is not good. A few dissenters report the whole thing is seasonal, but bulk of the evidence does not support this contention.

The situation shapes up like this:

(1) Demand for castings is down.

(2) Gray iron and malleable foundries generally are liquidating their iron inventories as fast as consumption will permit, or in some cases faster, and not without a certain element of panic.

(3) Foundries' analysis requirements are more exacting. Four months ago they were taking anything they could get.

(4) Stockpiling is pretty general among merchant iron producers in the north. Very little if any iron is being stockpiled in the south. But stockpiling as an industry practice is back to stay.

(5) Premium grades and alloy mixtures are probably due for the first drop in price.

(6) The merchant iron industry, which produced about 5,500,000 tons of foundry and malleable iron in 1948, will do well to produce 4,500,000 tons this year. Certainly, as one producer puts it, there is no inducement for anybody to push a furnace at the present time.

(7) Severe price testing of castings and merchant iron is under way.

An examination of these factors in detail reveals that merchant iron furnaces have already been taken out of production. It is also true that these furnaces were operated by newcomers to the merchant iron field.

The gray iron foundry industry is currently working at about 70 pct of capacity, an estimate based on the average of the best 6 months since V-J Day. But many foundries are working only 2 or 3 days a week, considerably less than the normal, 65 pct of capacity operations for the small shops. Backlog of orders in the gray iron industry Mar. 1 was 1,857,000 tons, or about 2 months' business, compared with 2,769,000 on Mar. 1, 1948. In other words, the past year has marked a 900,000-ton reduction in backlog.

Malleable iron founders are also operating at about 70 pct of capacity. Backlog Mar. 1 was 118,000 tons compared with 209,000 tons on Mar. 1, 1948.

About 980,000 tons of gray iron castings were produced in February, a 70,000 ton drop from January production of more than a million tons.

However, Raymond L. Collier, executive vice-president, Gray Iron Founders' Society, predicts that the gray iron foundry industry will produce 11,000,000 tons of castings this year. The industry produced 12,700,000 tons in 1948.

Many little foundries are closing down because of high break-even points, but this business will probably tend to fall into more experienced hands.

Also closing down are many of the opportunists who charged all the traffic would bear during the lush phase (1946-1947) of the postwar period, because they find themselves unable to adjust to periods of low demand and price concessions.

Foundry liquidation of iron inventories is proceeding at a clip that astounds some merchant iron producers. Almost all melters are consuming more iron than they're taking in. One midwest foundry was reported liquidating an inventory of 250 tons of foreign iron which cost $100 a ton and 500 tons of scrap costing $70 a ton.

It is possible, however, that such liquidations collectively and individually are being over-emphasized. Many foundries bought 1000 tons to 2000 tons of foreign iron last year as insurance, paying from $95 to $105 a ton. With cheap domestic tonnage almost a drug on the market, foundry operators know that they must get rid of the high cost tonnage before casting price concessions become prerequisite to orders. In other words, there is fear of being stuck with high-priced iron inventories and they are preparing for competition.

At the same time, pig is selling well above the cost of scrap, availability of which paralleled that of

Industrial Briefs . . .

• GROWING — The Weldaloy Products Co., Detroit, producers of resistance welding supplies, has purchased and are operating a new plant adjoining their present location. The metallurgical research and engineering divisions are housed in the new plant under the direction of C. R. Shroder.

• CONGRATULATIONS!—The National Assn. of Steel Exporters, Inc., will celebrate its first anniversary at a dinner to be addressed by the Honorable John J. Sparkman, U. S. Senator from Alabama, in New York on Apr. 21.

• NEW HOME—The Ajax Electric Co., Inc., Philadelphia, manufacturers of electrically heated industrial furnaces, has moved its manufacturing facilities to a new plant located at Tioga & Melville Sts.

• ANY SUGGESTIONS? — Gray Iron Founders' Society, Cleveland, has mailed copies of the outline of a Gray Iron Handbook to all foundries, inviting comments, suggestions and technical data to include in this publication.

• BRANCHING OUT—The Ingalls Iron Works Co., Birmingham, structural steel fabricators, has opened offices in the Continental Illinois Bank Bldg., 231 LaSalle St. in Chicago with Frank Atchison, Jr. in charge.

• TAKES OVER — Reynolds Metals Co., Richmond, Va., has purchased the former surplus government owned Extruded Metals, Inc., aluminum plant for a price of $1½ million. Reynolds has been operating the plant since June 1, 1946, under a 5 year lease with an option to lease for an additional 2 years.

• ZINC LEADERS — Edward H. Snyder, president of Combined Metals Reduction Co., Salt Lake City, has been elected president of the American Zinc Institute. Elected as vice-presidents were: Clarence Glass, Anaconda Sales Co., New York; George Mixter, U. S. Smelting Refining & Mining Co., Boston; and Raymond F. Orr, Athletic Mining & Smelting Co., Ft. Smith, Ark.

• UNITING — The American Brake Shoe Co. has arranged to purchase the government-owned plant adjacent to the Farrel-Birmingham Co.'s plant in Buffalo for $610,500 and will transfer operations of its Ramapo Ajax Div. at Niagara Falls and those at Hillburn, N. Y. to the newly-acquired factory.

• HEAD MAN—Leon J. Coslov, Tube City Iron & Metal Co., Glassport, Pa., has been appointed chairman of the midwestern division of the yard dealers committee of the Institute of Scrap Iron & Steel, Inc.

• NEW COMPANY — Announcement has been made of the formation of Christopher Williams & Co., Inc., with offices at 923 Penn Ave., Pittsburgh. The new company will act as engineers designing and building rolling mill equipment. They will also act as manufacturers representatives.

• BRITISH HOUSE—The Black-Clawson Co., Hamilton, Ohio, paper mill machinery manufacturers, has announced formation of B. C. International, Ltd., a new subsidiary in London, England. B. C. International will bring the manufacture of overflow vats driver calendar reverse machines and other paper machinery parts to England for the first time.

• EASTERN OUTLET—The Atlantic Gear Works, Inc., New York, has announced their appointment as an exclusive distributor of stock gears manufactured by the Ohio Gear Co. of Cleveland, for the states of New York, Connecticut and New Jersey.

foundry iron. Thus foundries are using only as much pig as it required for iron. Were pig the same price as scrap, the specifications for pig would probably preclude most of the current drop in merchant iron demand.

In general, foundries are continuing to accept the mills' quotas of merchant iron and will continue to use as much as competition permits. Trade reports indicate that about 20 to 25 pct pig is being used in the average foundry melt at present.

Many merchant iron producers have been stockpiling for the past 6 weeks. Here the producer offering from stock the broader spread of grades will be in the best position, other things being equal. Many foundries learned how to use alloys out of necessity during the shortage.

Past acceptance by foundries of material of almost any analysis resulted in some high scrap losses. Today they can pick their poison.

Price reductions in merchant iron will probably be made first by those producers with excess capacity who were not selling merchant products before the war. But it is also admitted that if there is no benefit in the form of a seasonal upturn, April will be the low melt month and a reduction will be in the wind. Ore and transportation costs are higher, but wages and coal are still to be settled.

While merchant iron producers are weathering what they hope is the worst of the decline right now, competitive factors loom large in the near future. Most pressing problem is how merchant iron will be sold. That is, how can it be sold profitably in a low-demand market under the producing point system. Buffalo is a case in point, with Bethlehem Steel Co., Republic Steel Corp., Hanna and Colorado Fuel & Iron Corp. producing merchant iron. In the Buffalo area there is not consumption for 10 pct of this production.

While a 20 pct drop in merchant iron production appears in prospect, much depends upon the remaining so-called fringe furnaces, and the newcomers. If they stay in business and blast, total production might reach 5,000,000 tons.

Only the optimists see this situation as a return to normalcy and a shake-out of high priced inventories.

Three Power Agreement Drastically Alters Plant Dismantling in Germany

Washington

• • • **Under a revised** agreement between the United States, the United Kingdom and France, 159 industrial facilities (including 144 complete plants) originally scheduled for dismantling as reparations will now be retained in western Germany.

A report by the Humphrey (ECA Industrial Advisory) Committee, after a survey of 381 plants, had recommended retention of 167 as essential to European recovery.

Facilities to be retained involve 32 steel plants, 88 metalworking facilities, 7 nonferrous metal facilities, and 32 chemical works.

Only five of the 32 steel works produce crude steel, according to the State Dept. Their retention will increase the rated German (western) capacity some 165,000 tons. It is now 13,300,000 tons.

However, the additional capacity will not make any change in actual production—now limited to 11,100,000 tons. Rather, retention is to assure usable capacity and a steadier output.

This much the same reason given for the decision to retain the 27 steel finishing facilities. Their capacity is considered necessary to assure efficient and effective use of the allowable German raw steel output.

George M. Humphrey, president of M. A. Hanna Co., headed the ECA advisory committee which made the study. It included Pres. Frederick V. Geier, of Cincinnati Milling Machine Co.; Pres. John L. McCaffrey of International Harvester Co.; Pres. G. A. Price of Westinghouse Electric & Mfg. Co., and Pres. Charles E. Wilson, of General Motors Corp.

In addition to the Humphrey survey, a special group headed by George W. Wolf of the U. S. Steel Export Co. made a special study of the August Thyssen Huette steel works in Hamborn. This is a complete plant with coking, sintering, pig iron, raw and finished steel-making facilities.

It was recommended that dismantlement be delayed up to five years until future requirements could be estimated more accurately. In the final decision, the three countries agreed to retain only the plant's sintering and power generating facilities.

Nearly 120 steel plants were studied by the committee. Only five of the total recommended by the group for retention were released for reparations removal under the final agreement. They were: Bochumer Verein A. G. Gusstahl, Bochum; Deutsche Edelstahlwerke, A. G. at Bochum; Kloeckner Werke A. G. at Dusseldorf; Huettenwerke Niederrhein, A. G. at Duisburg; and the Hoesch A. G. at Hohenlimburg.

Complete steel plants retained and their location (in parenthesis) are as follows:

Andernach & Blech (Hagen-Halden), Deutsche Roehrenwerke A. G. (Hilden), Rheinische Roehrenwerke A. G. (Dusseldorf), Eisenwerk Rothe Erde (Dortmund), Huettenwerk Oberhausen A. G. (Oberhausen), Robert Hermes, G.m.b.H. (Solingen), vom Hofe, Wilhelm, Draht u. Federwerk, (Altena), Kaltwalzwerk Plettenberg Brockhaus Sohne (Plettenberg), Kortenbach und Rauh (Solingen-Wald), Kronprinz A. G. fuer Metallindustrie (Immigrath), Lensen P. W. (Hohenlimburg), Friedrich Meyer Eisen u. Stahlindustrie (Dinslaken), Stahl-u. Roehrenwerk Reisholz A. G. (Duesseldorf), Rohr u. Walzwerk, Fr. Uebemann (Pulheim), Walz und Roehrenwerk, G.m.b.H. (Haan) Westfaelische Drahtindustrie (Haan), Wuragrohr, G.m.b.H. (Wickede), and Zieh u. Presswerk Carl Froh o.H.G. (Hachen).

Equipment or portions of the following plants were also retained:

Huettenwerke Siegerland A. G. (Niederscheldenden-Siegerland), Kloeckner A. G. (Troisdorf), Deutsche Edelstahlwerke A. G. (Krefeld), Eisenwerke Muelheim-Meiderich A. G. (Muelheim), Westfalenhutte Dortmund, A. G. (Dortmund), Huettenwerk Huckingen, A. G. (Huckingen), Eisenwerk Gelsenkirchen, A. G. (Gelsenkirchen), Stahlwerk Mark Wengern, A. G. (Wengern), Rheinische Roehrenwerke A. G. (Muelheim), Westdeutsche Mannesmann-Roehren A. G. (Rath), Westdeutsche Mannesmann-Roehren A. G. (Witten), Stahlwerk Osnabruck A. G. (Osnabruck), Reichswerke A. G. (Watenstedt), MIAG Muhlenbau u. Industrie A. G. (Braunschweig).

U.S. Steel Merges Railroads

Pittsburgh

• • • **Three railroads** owned and operated by the U. S. Steel Corp. will be merged in the near future, if the Interstate Commerce Commission approves a report of two of its examiners.

The examiners have recommended that the Pittsburgh, Bessemer and Lake Erie R.R. Co. and the Meadville, Conneaut Lake and Linesville R.R. Co. be merged with the Bessemer and Lake Erie R.R.

Stockholders of the three railroads have voted in favor of the proposed merger. U. S. Steel owns all capital stock in the Bessemer railroad and more than 80 pct of the voting power of Pittsburgh.

Unemployment Levels Off

Buffalo

• • • **Unemployment** appears to have leveled off in western New York, according to Leo A. Sweeney, district superintendent of the New York State Employment Service. There is little new hiring, but layoffs and hiring are about in balance.

HEALTH SURVEY: *Believing that healthy, satisfied workers are one of its greatest assets, American Brake Shoe Co. has purchased a bus-type G-E photoroentgen unit specially designed to provide periodic chest X-ray examinations for its 10,000 employees.*

Approves $19 Million For European Power Plants

Washington

• • • **Authorization** of nearly $19 million in ECA funds has been approved by the Economic Cooperation Administration for use in construction or improvement of power plants in Italy, Sicily, Denmark and the Netherlands. Virtually all of the equipment will be purchased from American manufacturers.

About $4.8 million will go to Sicily for building a new 60,000-kw steam generating plant at Palermo. An additional $6 million has been granted Italy for a 50,000-kw addition to facilities at Genoa.

A 60,000-kw expansion of Kyndby facilities in Denmark involves $5.7 million in ECA funds against a total estimated cost of $20 million. For the Netherlands, $3.3 million will be earmarked for purchase of equipment for the proposed 124,000-kw plant at the junction of Amer and Donge rivers in Noord Brabant province.

Reports Low Accident Rate for Coal Miners

Washington

• • • **Preliminary figures** by the Bureau of Mines indicate that the accident rate in coal mines in 1948 was one of the lowest on record, second only to 1944.

During the year, miners incurred 55,055 injuries, of which 1010 were fatal. Six major disasters were listed for the year with a total of 49 deaths—all in bituminous pits.

AMERICAN IRON AND STEEL INSTITUTE

Production of Open Hearth, Bessemer and Electric Steel Ingots and Steel for Castings

YEAR 1949

(Preliminary)

Period	OPEN HEARTH		BESSEMER		ELECTRIC		TOTAL		Calculated weekly production (Net tons)	Number of weeks in month
	Net tons	Percent of capacity	Net tons	Percent of capacity	Net tons	Percent of capacity	Net tons	Percent of capacity		
January	7,287,683	101.1	408,552	92.6	487,260	93.8	8,183,495	100.2	1,847,290	4.43
* February	6,633,779	102.0	379,698	95.3	467,244	99.6	7,480,721	101.4	1,870,180	4.00
† March	7,465,494	103.6	430,176	97.5	493,295	95.0	8,388,965	102.7	1,893,672	4.43
† *1st Quarter*	*21,386,956*	*102.2*	*1,218,426*	*95.2*	*1,447,799*	*96.0*	*24,053,181*	*101.5*	*1,870,387*	*12.86*
April										4.29

† Preliminary figures, subject to revision.
* Revised.

YEAR 1948

Period	OPEN HEARTH		BESSEMER		ELECTRIC		TOTAL		Calculated weekly production (Net tons)	Number of weeks in month
	Net tons	Percent of capacity	Net tons	Percent of capacity	Net tons	Percent of capacity	Net tons	Percent of capacity		
January	6,768,497	95.5	343,169	77.5	361,110	79.0	7,472,776	93.6	1,686,857	4.43
February	6,245,338	94.3	340,596	82.3	354,270	82.9	6,940,204	93.0	1,676,378	4.14
March	6,841,578	96.6	363,235	82.0	403,322	88.2	7,608,135	95.3	1,717,412	4.43
1st Quarter	*19,855,413*	*95.5*	*1,047,000*	*80.6*	*1,118,702*	*83.4*	*22,021,115*	*94.0*	*1,693,932*	*13.00*
April	5,640,168	82.2	185,089	43.2	392,900	88.7	6,218,157	80.4	1,449,454	4.29
May	6,799,289	96.0	355,562	80.3	416,801	91.1	7,571,652	94.8	1,709,177	4.43
June	6,481,879	94.5	356,810	83.2	417,665	94.3	7,256,354	93.8	1,691,458	4.29
2nd Quarter	*18,921,336*	*90.9*	*897,461*	*69.0*	*1,227,366*	*91.4*	*21,046,163*	*89.7*	*1,617,691*	*13.01*
1st 6 Months	*38,776,749*	*93.2*	*1,944,461*	*74.8*	*2,346,068*	*87.4*	*43,067,278*	*91.9*	*1,655,797*	*26.01*
July	6,346,423	89.8	324,991	73.6	395,610	86.7	7,067,024	88.7	1,598,874	4.42
August	6,631,157	93.6	371,205	83.8	435,246	95.2	7,437,608	93.1	1,678,918	4.43
September	6,592,226	96.3	387,153	90.5	436,231	98.7	7,415,610	96.1	1,732,619	4.28
3rd Quarter	*19,569,806*	*93.2*	*1,083,349*	*82.5*	*1,267,087*	*93.5*	*21,920,242*	*92.6*	*1,669,478*	*13.13*
9 Months	*58,346,555*	*93.2*	*3,027,810*	*77.4*	*3,613,155*	*89.4*	*64,987,520*	*92.1*	*1,660,386*	*39.14*
October	7,118,299	100.5	409,545	92.5	459,268	100.4	7,987,112	100.0	1,802,960	4.43
November	6,922,656	100.9	411,049	95.9	454,217	102.6	7,787,922	100.7	1,815,366	4.29
December	6,925,300	98.0	393,609	89.1	452,266	99.1	7,771,175	97.5	1,758,184	4.42
4th Quarter	*20,966,255*	*99.8*	*1,214,203*	*92.4*	*1,365,751*	*100.7*	*23,546,209*	*99.4*	*1,791,949*	*13.14*
2nd 6 months	*40,536,061*	*96.5*	*2,297,552*	*87.5*	*2,632,838*	*97.1*	*45,466,451*	*96.0*	*1,730,737*	*26.27*
Total	79,312,810	94.9	4,242,013	81.2	4,978,906	92.3	88,533,729	94.0	1,693,453	52.28

Note—The percentages of capacity operated are calculated on weekly capacities of 1,599,286 net tons open hearth, 99,962 net tons Bessemer and 103,228 net tons electric ingots and steel for castings, total 1,802,476 net tons; based on annual capacities as of January 1, 1948 as follows: Open hearth 83,610,690 net tons, Bessemer 5,226,000 net tons, Electric 5,396,770 net tons, total 94,233,460 net tons.

Allocation Program May Go Out the Window Before Legal Deadline

Washington

• • • **Further indication** that the voluntary steel allocation program may well be dead before the legal authorization expires in September was seen in the announcement last week by Commerce Secretary Sawyer of more and deeper cuts in the set-asides.

July figures have been cut back 170,171 tons below the June figure of 442,415 tons. Largest reduction was in the freight car program which was reduced to 25,000 tons over the June allotment of about 190,000 tons.

Evidence of the falling apart of the program as steel supplies become easier is seen in the recent progressive downward revisions despite new programs. In February the overall allocation was 539,000 tons; in May, 534,600; in June, 442,400, and for July, 272,200 tons.

July allocations for federal reclamation work were increased from 13,641 tons to 23,538 tons. Allocations remaining unchanged were 64,371 tons for the armed forces, 4750 tons for Oak Ridge pipeline, and 11,729 tons for shipbuilding. The July status of the other programs is:

Heating equipment. About 9000 tons for furnace pipe fittings and ducts, July through September. Original plan made 24,600 tons available during second quarter for furnaces and did not extend past June 30.

Baseboard radiation. Present allocations of 950 tons monthly will be extended through the third quarter.

Anthracite mining. Third quarter allocations are reduced from 2000 to 1500 tons monthly.

Mining machinery. Present allocations of 31.785 tons monthly cut back to 19,000 tons for third quarter.

Steel for ECA. Overall allocation of 159,264 tons unchanged, although monthly figures may vary because of delay in orders.

Tankers. Present quota of 31,550 tons reduced to 26,000 tons a month for third quarter.

Oil field goods. Monthly allotments reduced from 16,530 to 13,000 tons for third quarter.

Atomic energy construction. Increased from present 10,340 to 16,210 tons. These allocations had previously been cut back from 22,256 tons.

Grain bins. Additional allowance of 100 tons each of black sheet and bar angles raises allocations from the original 8400 tons to 8600.

Barges. Cut back from 11,202 tons to 10,000. This program may end by August.

Aeronautical agencies. Increased from 1000 to 1614 for July only. May also die at that time.

GM Breaks Postwar Record

Detroit

• • • **March production** of cars and trucks in the United States and Canada by General Motors has broken the postwar GM record by 19,166 units set in March, 1948. A total of 228,763 cars and trucks was produced in the U. S. and Canada by GM subsidiaries during March, according to a company announcement.

For the year to date GM has produced 570,692 units in U. S. and Canada compared with 547,017 for the same period in 1948.

Increases Coke Capacity

Gary

• • • **John H. Vohr,** superintendent of the Gary Works, Carnegie-Illinois Steel Corp., announced the completion of the No. 16 battery of coke ovens at the Gary plant. The battery includes 77 ovens and increases the plant's total output by more than 1000 tons per day.

Construction Volume Up With Overall Drop in Materials Output

Washington

• • • **Preliminary figures** for the first quarter 1949 indicate that dollar volume of construction is greater than last year. But production of building materials is leveling off as supplies come into balance with demand.

New construction put in place in March was valued at $1.2 billion, 2 pct above March of last year, according to Commerce Dept. figures. The first quarter total, at $3.5 billion, was up 5 pct over the period last year.

At the same time, the department reported an overall decline in building materials output. January estimates were down 11.5 pct over last year.

Some lines, where there are still shortages such as nails and reinforcing bars, were still producing at rates above last year, however.

Industrial building (factories, etc.) has slowed down to a $100 million a month pace, nearly 20 pct below last year's first quarter average. Commercial construction (stores, etc.) continues at a higher rate than for 1948.

Due to an open or earlier season in some areas, highway work is well ahead of last year's rate and value. Farm construction is also on the increase.

Coming Events

Apr. 22-23	**American Institute of Mining & Metallurgical Engineers,** New England regional meeting, Springfield, Mass.
Apr. 25-26	**American Supply & Machinery Manufacturers Assn.,** Triple Mill Supply convention, Cleveland.
May 2- 3	**Assn. of Iron & Steel Engineers,** annual conference, Baltimore.
May 2- 4	**American Society of Mechanical Engineers,** spring meeting, New London, Conn.
May 2- 5	**American Foundrymen's Society,** annual convention, St. Louis.
May 4- 7	**Electrochemical Society,** semiannual meeting, Philadelphia.
May 5- 6	**American Society for Quality Control,** annual convention, Boston.
May 11-13	**National Welding Supply Assn.,** annual convention, Cincinnati.
May 12-13	**Rail Steel Bar Assn.,** annual meeting, Chicago.
May 12-13	**Instrument Society of America,** spring meeting, Toronto.
May 18-20	**National Steam Specialty Club,** annual meeting, Skytop, Pa.
May 19-21	**Society for Experimental Stress Analysis,** spring meeting, Detroit.

OIT Removes Export Quotas On Iron, Steel Products; Regulations Unchanged

Washington

• • • **Quantitative export** quotas (open-ending) on 27 iron and steel products were recently removed by the Office of International Trade. Included were wire mill products, rails, ingots, billets, bars, sheet, strip, pipe, structural shapes, forgings, and railway car wheels.

Exporters of these items, however, must continue to obtain validated OIT licenses and to observe all applicable export regulations. Except for certain wire mill products, applications may be filed at any time.

At the same time, OIT increased export quotas for nails and miscellaneous pipe fittings. In addition, the agency lifted license requirements from certain reject items for Group R countries. Included were tinmill black plate, wasters, waste-wasters, cold rolled carbon, coil and wasters, and other secondary items. But reject certificates must accompany shipments.

Easing of the domestic supply was given as the reason for relaxing steel export controls. But OIT said there was no immediate prospect of removing controls on the still tight flat-rolled and tubular products such as plates, galvanized sheets, galvanized pipe, large diameter line pipe, and transformer grade electrical steel.

Applications for licenses to export wire rods, uncoated wire and galvanized wire may be filed at any time after Apr. 25, but applicants must certify on the application that orders from abroad were either placed or reconfirmed on or after Apr. 20. Previously established second-quarter quotas for these items will be licensed and all applications either acted upon or returned without action by Apr. 25.

A listing of commodities affected by last week's action follows:

Delete from the Positive List:

Reject iron and steel (tin mill black plate—reject; waste; waste-waster; CR carbon steel—reject; coil and waste; other secondary).

Open-end quotas were established for the following:

Schedule B No.	Commodity
601550	Rerolling rails
601605	Carbon steel ingots
601606	Carbon steel billets
601609	Carbon steel sheet bars
601705	Alloy steel ingots
601706	Alloy steel billets
602010	Carbon steel bars, CR
602090	Alloy steel bars, CR
602100 / 602300	Iron and carbon steel bars—HR over 1 in.
602600	Alloy steel bars, HR
602900	Wire rod
603595	Electrical sheet, non-transformer grade
603810	Carbon steel strip, etc., HR
604500	Structural shapes, except fabricated
604600	Structural shapes, fabricated (except houses)
605000	Sheet piling
605200	Rails, under 60 lb per yd
605300	Relaying rails
607100	Wrought iron pipe, black
607300	Wrought iron pipe, galvanized
607400 / 607500 / 607705	Iron and steel pipe, n.e.s.
608100	Iron and steel wire, uncoated
608200	Galvanized wire
609198	Iron and steel wire, n.e.s.
610515	Iron railway car wheels
610700 / 610800	Iron and steel forgings, n.e.s.
	Other reject iron and steel

The quotas shown below have been revised.

Closes Assembly Plant

Detroit

• • • **F. L. Jacobs Co.,** manufacturers of automotive parts and home appliances has closed its assembly plant at Indianapolis and a leased plant at Louisville.

According to a company spokesman, operations formerly performed in these plants has been transferred to the Detroit and Traverse City, Mich., plants of the company. The Indianapolis plant was formerly used to assemble Coca-Cola vending machines and Launderall home laundry units. The Louisville plant produced parts for Launderall home laundry units.

In the future, Launderall home appliances will be assembled at the company's Spruce St. plant in Detroit. Coca-Cola vending machines will be produced at Traverse City.

Revised Export Quotas

Schedule B No.	Commodity	Second Quarter From	Second Quarter To
606500 / 606600 / 607798 / 610100	Miscellaneous pipe fittings, 150 lb pressure and under	6500 ton	7500 ton
609200	Wire nails	10,000 ton	12,500 ton
609500	Other nails		

Lukens Mill Electrified

Schenectady

• • • **The General Electric** Co. will supply more than $1 million worth of equipment to convert to electric drive the 206-in., 4-high plate mill located at Lukens Steel Co., Coatesville, Pa., it was announced recently.

The new drive will replace the 15,000-hp twin tandem cross compound steam engine now used on the mill. Installed during World War I, the mill can roll ingots up to 55 tons.

The reversing motor to be supplied by G. E. will be a twin drive, with two 4000-hp, 30 to 75-rpm, 600-v reversing motors; one direct connected to the top work roll and the other to the bottom work roll of the mill. The complete drive will have a continuous torque rating of 1,400,000 lb-ft and a maximum torque rating of 3,850,000 lb-ft.

Power will be supplied to the reversing drive from a flywheel set consisting of four 1750-kw, 514-rpm, 600-v generators, a 7000-hp, 13,200-v, 3-phase, 60-cycle, wound rotor induction motor, and a 200,000-hp-seconds steel plate flywheel.

Research Work Increases

Birmingham

• • • **Showing an increase** of $86,240 over the previous year, research work volume of Southern Research Institute here during 1948 amounted to $406,840.

Institute director William M. Murray reported that more than 50 active projects were under way in the institute's laboratories at the end of 1948. Unexpended balance of sponsors' contracts and other commitments totaled $300,627, compared with $240,000 at the close of 1947.

British Abolish Subsidy to Steel Industry; Prices Up 9 Pct

Exchequer Losses Financed By Levies on Producers; Rise Serious to Economy

o o o

By F. H. HARLEY
English Correspondent

o o o

London

• • • **British iron** and steel prices were increased by an average of 9 pct on Apr. 1, as a direct result of the withdrawal by the Government of various subsidies previously borne by the central authority.

As a result of the abolition of the subsidy the steel industry will take over two principal charges from the Exchequer. The first of these is the loss attributable to abnormal freight rates on iron ore.

In the hope that freight rates would return to more normal levels within a reasonable time, the Government decided in 1946 to stabilize the rates charged to the iron and steel industry at 50 pct above prewar and to debit any excess to Government account. In the event, the fall in freight rates was more gradual than had been expected and the decision was accordingly taken last summer to charge the industry 100 pct above the prewar rates.

This cost increase was carried by the steel industry pending the completion of the official price review. As a result of the latest decision, the industry will in future bear the full freight charges, which are still over 200 pct above prewar.

The second principal charge now being taken over from the Government is the loss incurred on imported scrap and pig iron, which arose because the foreign prices of these materials were well above the British level. This is an important item which has been expanding rapidly.

In 1946 there was a negligible sum to be provided under this head, while in 1947 the scrap obtained from Germany was charged to the industry at the British price and no loss appeared in the accounts; in 1948, however, commercial scrap began to flow from Germany, the price going up to a high level as a result of the world shortage of scrap. Moreover, since November, scrap acquired outside normal commercial channels has been charged at the price for scrap imported commercially.

The breakdown of the subsidy for the last 3 years (the 1948-9 figures being estimated) is at rght.

Coincidentally with the withdrawal of the subsidies the price structure of the industry has been reviewed, with particular reference to the rise in the industry's costs over the last 12 months, with its differing incidence on differing products. The principal result will be to allow some part of the Exchequer losses to be absorbed in the finishing trades, while improving the results on the primary products.

Besides the general price review it has also been decided to sweep away the old "loyalty" rebates. These were initiated way back between the two wars as an incentive to consumers to place their orders with home manufacturers.

Later the system was extended to cover purchases from member firms of the trade associations. With the outbreak of war in 1939, foreign competition ceased and price control eliminated the other reason for the rebates, which nevertheless were continued. Now swept away, they ranged from $1.00 on pig iron to $3.00 on finished steel. The new price levels now established reflect the dropping of these rebates.

At the same time, a number of important readjustments of prices within each of the sections of the trade has been made. For example, in the case of sheets and tinplate, greater provision has been made than previously to reflect the reduction in costs brought about through the introduction of continuous methods of production. This has been done, not by a general lowering of the basis price — which is broadly fixed on an average over the whole trade, including both hand and continuous mills—but by making substantial allowances off the basis price for the classes of orders normally handled by the strip mills.

Even at the new levels, steel prices show a considerably smaller increase, as compared with prewar, than most other basic products. It is estimated that the latest changes may raise the iron and steel component in the Board of Trade index of wholesale prices by about 16 points to around 187 (1938 = 100). On the same basis, coal now stands at a figure of 245, while the index for all industrial materials and manufactures is around 240. British steel prices will also still compare favorably with those of any country except Australia—in so far as differences in quality and conditions allow any comparison to be made.

The Exchequer losses, now transferred to the industry, will be financed, for the present at least, largely by means of levies on producers. Thus the greater part of the loss on imported raw materials is being carried by a general levy of $5.20 per ton of steel ingot production, representing on the average approximately $7.20 per ton of finished steel.

In the case of steel castings, $7.20 a ton is being collected at the ingot stage. Similarly, for semi-finished steel, the loss is being covered by a levy of $2.60 a ton on the home output of this item, whether produced for use in the producer's own works or for sale to another firm.

It is proposed to review the amounts of the levies every 6 months in relation to the import program and the level of import

(*Continued on page* 130)

Exchequer Losses
(excluding Import Duties)
(thousands of dollars)

Type of Loss	1946-7	1947-8	1948-9
Imported iron and manganese ore freights	27,100	28,200	24,000
Imported scrap	824	1,468	21,640
Imported pig iron	24	264	3,064
Home ore	2,660	3,168	3,600
Imported semi-finished	6,400	7,600	10,296
Imported finished steel	1,200	3,656	12,600
Total	38,208	44,356	75,200

Canadian Production Up For Ingots and Castings

Toronto

• • • **Canadian production** of steel ingots and castings for February amounted to 259,271 net tons, for a daily average of 89.1 pct of rated capacity, and compares with 284,707 tons for January when the daily average was 88.4 pct, and with 239,646 tons in February 1948. Production for February this year included 244,710 tons of steel ingots and 14,561 tons of steel castings.

Charges to steel furnaces in February included 133,982 tons of pig iron; 75,745 tons of scrap of consumers' own make and 77,043 tons of purchased scrap.

For the first 2 months this year production of steel ingots and castings totaled 543,987 net tons compared with 496,372 tons for the 1948 period and 479,020 tons in 1947.

To Study Power Systems

Washington

• • • **Twenty-seven** electrical and mechanical engineers are now learning how the United States operates and uses its large interconnected electric power systems as well as how maintenance and repairs are scheduled. A grueling month-long schedule has been tentatively laid out by the ECA which is sponsoring the visit.

This schedule includes visits to the Tennessee Valley, Niagara Falls, and varied private systems in Pittsburgh, Philadelphia, New York, Buffalo, Chicago, Schenectady and Milwaukee.

Visits will be made to Westinghouse and General Electric plants as well as to the Baldwin Locomotive turbine works. Inspection will be made of several power facilities including American Gas & Electric Corp., Consolidated Edison Co., Buffalo-Niagara Electric Co., and Wisconsin Electric Power Co.

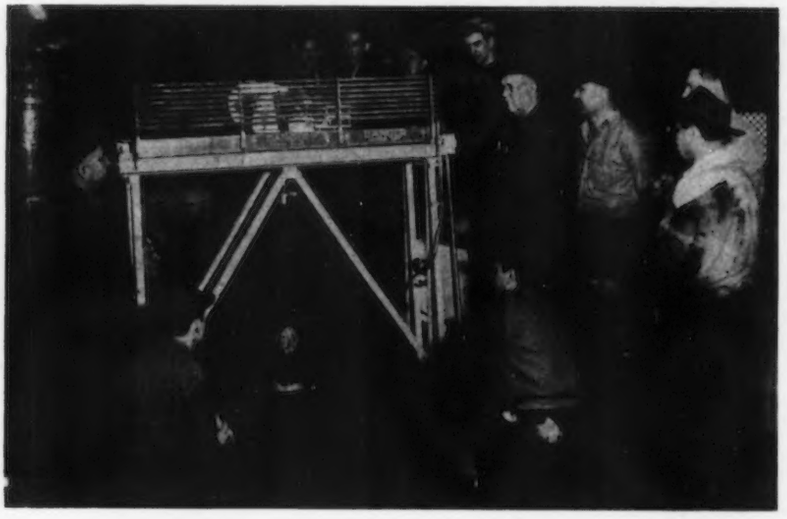
Exempts Over 30 Items From Cargo Insurance

Washington

• • • **Shipments** of iron ore, scrap iron and steel, and ores in bulk need not be covered by insurance while being moved in trucks, the Interstate Commerce Commission has decided.

The Commission's decision became effective Apr. 18. More than 30 other low-value products are included in ICC's new list of exemptions. However, truckers still are required to furnish surety bond or other form of insurance for all other goods moving in interstate commerce by motor carrier.

SAFETY MODEL: *This model crane, built during the war to train women crane operators, has been dusted off by Youngstown Sheet & Tube Co. as part of a safety drive. Scaled to 1/32 the size of the original, it is making the rounds of company shops in a safety refresher course for crane operators and crane followers.*



Auto Sales Up Sharply During March and April

Detroit

• • • **Retail sales** of automobiles have followed the usual seasonal pattern, increasing sharply during March and April, according to automotive sources.

Hudson reports the heaviest retail sales during the past 20 years. According to a Hudson spokesman, sales during January and February were 55 pct greater than for the same period of last year, totaling 24,637 units.

Similarly, Chevrolet has announced that March sales of trucks were the highest on record. A total of 33,804 units were delivered at retail in U. S. during the month. According to a company spokesman, this is 10 pct better than the previous all-time peak set 11 months ago.

Total Chevrolet trucks sales volume for 1948 was the highest for any company in the history of the automobile industry.

ECA Plans Changes In Transport Requirements

Washington

• • • **Less railroad** and more motor transportation equipment is apparently in the cards for Marshall Plan countries over the next year.

Reviewing the situation, the Economic Cooperation Administration finds that recovery of Europe's transportation system has been so rapid that the $140 million originally estimated for equipment over the second year will be trimmed substantially.

At the same time, ECA said its current plans included expansion of Europe's motor transport system. It is estimated that more than $40 million will be earmarked for this portion of the recovery program.

AcceptsSCAPAppointment

Washington

• • • **Calvin Verity,** former executive vice-president and general manager of the Armco Steel Corp., Middletown, Ohio, has accepted an appointment as industrial adviser to SCAP and Director of Industrial Production and Public Utilities, Economic and Scientific Section, General Headquarters, SCAP.

Construction Steel . . .

• • • **Fabricated steel inquiries** this week included the following:

125 **Tons, Pierce Co., Wash., bridge on PSH No. 5, Buckley to Enumclaw, Director of Highways, Olympia, bids to Apr. 29.**

• • • **Reinforcing bar awards** this week included the following:

925 **Tons, Berkeley, Calif., Engineering building, University of California, through James I. Barnes, to Herrick Iron Works, Oakland.**

900 **Tons, Indianapolis, veterans hospital, J. L. Simmons Co. Previously reported low bidder, has received the contract.**

500 **Tons, Illinois and Iowa, television towers through McDonald Engineering Co. for American Telephone & Telegraph Co. reported last week, U. S. Steel Supply Corp. will furnish the bars.**

450 **Tons, River Forest, Ill., Wieboldt store building to J. T. Ryerson & Son, Chicago.**

170 **Tons, Chicago, building for Illinois Institute of Technology through Sumner Sollitt Co., Chicago, to J. T. Ryerson & Son.**

105 **Tons, Portland, Ore., railroad highway separation, Sundial section, Columbia River Highway, through Carl M. Halvorson to Mercer Steel Co.**

• • • **Reinforcing bar inquiries** this week included the following:

1035 **Tons, Los Alamos, Calif., structures for Delta-Mendota Canal, bids to be called soon by Bureau of Reclamation, Denver.**

690 **Tons, Los Angeles, Sawtelle-Westwood system channel improvement, Los Angeles District Corps of Engineers Inv. 67, bids to May 10.**

575 **Tons, Columbia Basin Project, Wash., structures on Winchester waterway, bids to be called soon by Bureau of Reclamation, Denver.**

250 **Tons, Chicago, freight house for the Burlington Railroad.**

• • • **Fabricated steel awards** this week included the following:

860 **Tons, Chicago, plant addition for Sunbeam Corp to J. T. Ryerson & Son, Chicago.**

400 **Tons, Chicago, building for E. H. Sargent & Co. to J. T. Ryerson & Son, Chicago.**

370 **Tons, Portland, Ore., railroad highway separation, Sundial section, Columbia River highway, through Carl M. Halvorson to Mercer Steel Co.**

200 **Tons, East Peoria, Ill., a beam bridge through U. S. Engineers Office, Chicago, to Bethlehem Steel Co., Inc., Bethlehem.**

CPUC Grants Freight Rise

San Francisco

• • • **Steel users in** California who have been fortunate enough to get by for several months without bearing the 4 pct freight rate increase on intrastate shipments granted by ICC, last week found themselves in the national pattern. The California Public Utilities Commission granted railroads the 4 pct hike after public hearings during which the carriers reported that their net operating revenue for 1949 would be about $40 million less than in 1948.

Shipbreaking Scrap Firms Study Export Potential

Philadelphia

• • • **Heavy imports** of foreign scrap and the lack of sustained buying by domestic mills is causing shipbreaking firms to give serious consideration to the prospect of closing down their operations. Some are canvassing the prospect of exporting scrap due to the lack of a market here.

Max Rose of Northern Metals Co., here, has said that it may be necessary to close down its Tacony shipbreaking yard which has been in operation for the last 14 years. He reports that there is no market for the ship scrap already on hand, and that three additional ships are yet to be received for breaking.

In Baltimore, the Boston Metals Co., a shipbreaker that also operates a Los Angeles yard, finds itself with reduced market possibilities at both yards. Baltimore production has been going almost exclusively to the Sparrows Point, Md., mill which is no longer taking any domestic scrap. This firm was formerly a factor in the export market, shipping to Chile, Brazil and Argentina out of its California plant. The company is giving some consideration now to the possibility of exporting scrap to Europe, principally to England, Italy and Belgium, countries that are reported to be in need of scrap.

50 YEARS AGO

THE IRON AGE, *April 20, 1899*

• "The Bethlehem Steel Co. of Philadelphia capitalized with $5000, were chartered by the Pennsylvania State Dept. on Monday for the manufacture of iron or steel, or both, or of any other metal, or of any article of commerce from metal or wood or both."

• **"The fourth annual convention of the American Foundrymen's Assn. will be held in Pittsburgh, Pennsylvania, May 16 to 19."**

• "The demand is only fair, but stocks are so light that makers have no trouble in securing full prices. More interest is manifested in long deliveries, and prices for such are a trifle easier, as quite a number of furnaces that are just starting in are offering metal at a slight reduction, and as they have no old contracts at low prices they are in a better position than others who are trying to make an average."

• **"The Baldwin Locomotive Works, Philadelphia, have received an order for 60 engines from the Indian Government."**

• "At the meeting of the Government Committee of the New York Stock Exchange held last Thursday, the stocks of the Pressed Steel Car Co. were regularly listed."

• **"The American Shipbuilding Co. have leased the property of the Union Dry Dock Co., Buffalo, New York, for a period of 99 years."**

• "The Munising Furnace Co. have been organized with a capital stock of $250,000 to build a 125-ton charcoal blast furnace at Munising, Mich."

• **"The 10-in. mills of the Warren plant of the National Steel Co. at Warren, Ohio, will be started this week after an idleness of some months."**


JOHN PAYS THE BILLS —AND LEARNS
JOHN, THIS EDITION OF THE NEWS SURE HAS A LOT OF INFORMATION IN IT...
OH!...THAT'S THE REPORT THEY MENTIONED AT THE SHOP...I WANT TO READ THAT
SEE, DAD, I'D LIKE TO SHOW THAT TO MY CIVICS TEACHER...
YOU CAN LOOK AT IT NOW, BOB, IF YOU'LL RETURN IT. I WANT TO READ IT AGAIN AFTER I TAKE A SNOOZE...DID YOU NOTICE THE COMPANY TOOK IN $973,911,544 LAST YEAR? WOULD I LIKE TO HANDLE THAT DOUGH!
MILLIONS... 973 MILLIONS
WOW!....IMAGINE ME WITH THIS JOB....AND WITH ALL THE MONEY WESTINGHOUSE TOOK IN LAST YEAR... 973 MILLION DOLLARS!
WERE THE 106,000 WESTINGHOUSE EMPLOYES. OUR PAY FOR THIS YEAR COMES TO $381,998,267
WHEW! THEY TOLD ME THE EMPLOYES' SHARE WAS SMALL... WHY THAT'S ALMOST HALF OF WHAT THE COMPANY TOOK IN!
HERE'S THE BILL FROM OUR SUPPLIERS. EVERYTHING WE BUY HAS COST US A LOT MORE THIS YEAR. THE TOTAL BILL IS $460,620,346
THAT'S ALMOST ANOTHER HALF OF OUR MONEY GONE
I'M THE TAX COLLECTOR YOUR TAXES IN 1948 AMOUNTED TO $55,702,535
WOW!
JOHN, WAKE UP! WE'RE DUE AT THE PRESTONS AT 8 O'CLOCK... YOU'LL HAVE TO HURRY
NOTHING LEFT... NOT A PENNY. IT DOESN'T SEEM POSSIBLE. LET ME SEE THAT REPORT AGAIN
973 MILLION

Comics In Industry

• • • **Polls don't show it,** but millions of children from 6 to 60 don't read anything more complicated than comic books. Public and personnel relations men are beginning to realize this—witness these two new approaches to the problem of telling the industry story in such a way that people will read and believe it.

To present its annual report in an attractive package the center spread of the employee publication "Westinghouse News" shows John, a Westinghouse worker, daydreaming about how he, as president, would handle the $973 million receipts of the company in 1948. John dreams through payments for raw materials, taxes, insurance, etc., in brightly drawn comic character style, *sans* sex, winding up by accounting for every dollar taken in during the year.

"Steel" was prepared for steel firms wishing to distribute it. It is a colorful 16-page booklet that takes Jimmy and his dad through a steel mill. Before the trip is over Jimmy and the reader get a grasp on the job the steel industry is doing, why steel's price is relatively low and how widely steel is used. Space is provided on the cover for the name of the steel company that buys and distributes the booklet.

LEFT: *A portion of the comic book type presentation of the Westinghouse annual report for* 1948.

RIGHT: *In fine comic strip fashion the booklet "Steel" takes the reader through a steel mill.*

British Steel Prices

(*Continued from page* 125)

prices, so that over a period the levy account may be self-balancing.

How some of the individual products have been affected, after all changes have been taken into account, is shown in the accompanying table:

NEW BRITISH PRICES
(per ton of 2240 lb)

Product	Price	Increase
Basic pig iron	$39.50	$2.50
Hematite pig iron	47.30	6.80
Foundry pig iron	40.10	2.05
Heavy sections (angles)	78.70	10.40
Heavy rails	76.50	9.20
Plates	82.90	11.60
Billets (soft basic)	67.30	10.80
Light sections	87.20	11.20
Cold-rolled strip	127.10	8.80
Bright steel bars	124.45	5.85
Wire rods (soft basic)	84.45	10.45
Wire (mild steel)	112.00	8.50
Alloy black bars	142.95	9.05
Tin plate (per box)	8.30	0.80

Comments by consuming interests include the following:

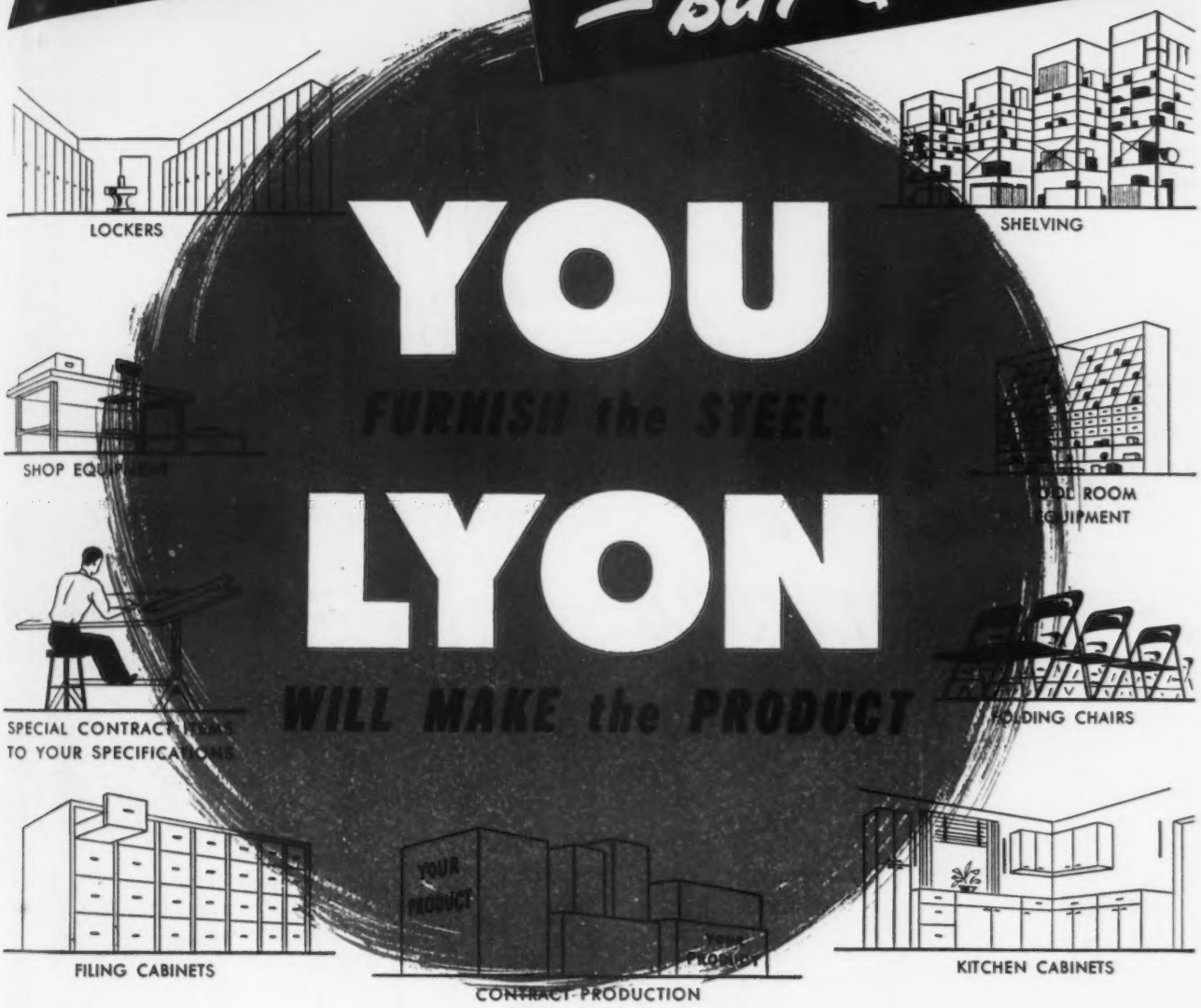
Shipbuilding — The substantial advance in steel prices could not have been more untimely for British shipbuilding, when the flow of new orders is at its lowest level since the war and practically non-existent for some types of ships, and when the industry is under urgent pressure from both British and foreign shipowners to reduce costs in order to stimulate orders.

Automobiles — The Society of Motor Manufacturers & Traders: "It seems that when present stocks of steel are exhausted, prices of the popular type of car would have to rise about $8 or $12. This is naturally a serious increase, but we must recognize that, when the subsidy is removed, steel prices are bound to rise to their economic levels."

Steel Producers—The British Iron & Steel Federation made this comment: "The steel industry readily accepts the decision of the Government to transfer from the Exchequer to the industry the so-called subsidies on imports of high-priced raw materials and semifinished steel.

"This change in policy means that the full cost of all raw materials and semifinished steel used in the industry and brought into Britain from abroad will now be reflected in British steel prices."

WHAT DO YOU NEED? —BUT QUICK!



YOU FURNISH the STEEL LYON WILL MAKE the PRODUCT

● We can make prompt delivery on LYON Products if you will furnish us with the sheet steel. We will buy the steel from you and ship the pound-for-pound equivalent in either standard LYON Products at regular published prices (see partial list below) or special items made to your specifications.

Ask your nearest LYON Dealer or LYON District Office for details of the "Customer Steel" plan.

A PARTIAL LIST OF LYON PRODUCTS

- Shelving
- Lockers
- Wood Working Benches
- Economy Locker Racks
- Kitchen Cabinets
- Display Equipment
- Hanging Cabinets
- Welding Benches
- Filing Cabinets
- Cabinet Benches
- Folding Chairs
- Drawing Tables
- Storage Cabinets
- Bench Drawers
- Work Benches
- Drawer Units
- Conveyors
- Shop Boxes
- Bar Racks
- Bin Units
- Tool Stands
- Service Carts
- Hopper Bins
- Parts Cases
- Flat Drawer Files
- Tool Trays
- Desks
- Stools
- Tool Boxes
- Sorting Files
- Ironing Tables

LYON METAL PRODUCTS, INCORPORATED

General Offices: 436 Monroe Avenue, Aurora, Illinois
Branches and Dealers in All Principal Cities

Asks Termination Of Scrap Drive; Supply Situation Improves

Washington

• • • **Secretary of Commerce** Charles Sawyer last week requested the Scrap Drive Committee to terminate its iron and steel heavy scrap campaign as of May 15, because of improvement in the scrap supply situation.

"Tonnage figures on the amounts of scrap collected during the drive are not obtainable but we know that the scrap supply situation has improved," Secretary Sawyer said. "Shipments of heavy scrap from Germany steadily increased during the latter half of 1948, and January and February shipments this year amounted to 150,000 and 143,000 tons, respectively. The quality and quantity of scrap being obtained by the steel mills as a result of the industrial scrap drive has improved considerably, thereby making possible the production of more steel, more quickly.

"Although the quantities of scrap available at the moment are adequate to take care of the country's needs for peacetime operations, it should be made plain that there is no excessive quantity of scrap in the United States. If steel production is to continue at the present high rate and if consumer demands for steel products are to be met, a constant flow of heavy scrap to the steel mills and foundries must be maintained.

"We should not be misled by the fact that demand for scrap has slackened somewhat in recent weeks. The current easing of scrap market conditions does not reflect our heavy requirements for steel for our domestic economy, military establishment and foreign aid program. Demand, as exemplified in the market, is not synonymous with present and future potential requirements.

"Furthermore, as I stated in commenting on the report of the scrap mission which recently returned from Japan, we do not have the amount of scrap needed in case of an emergency, and the stockpiling of high grade steel scrap is in my opinion desirable."

Predicts Brazil Will Be World's Largest Producer of Tungsten

New York

• • • **Brazil** is in a position to step up its production of tungsten ores and concentrates to become one of the world's largest producers of high grade concentrates, according to Luciano Jacques de Moraes, former director of the Brazilian National Dept. of Mineral Production. The statement, reported by the Brazilian Government Trade Bureau, was based on the presumption of additional capital investment sufficient to equip mining areas with modern mining equipment.

According to de Moraes, Brazil was exporting 20 pct of world consumption of tungsten in the war years, although before the war it had contributed only small amounts. This, he said, was due to elimination of China, which normally produces 60 pct of total exported tungsten.

He pointed out that China's position as a tungsten exporter has again become doubtful and that Brazil may be called on to take up the slack for the U. S. market.

Only a few of Brazil's deposits of tungsten ore are being worked, he said. Most developed deposit lies in the Seridó area of the states of Rio Grande do Norte and Paraíba, where the Brejuí Mines turn out about 10 tons of ore weekly.

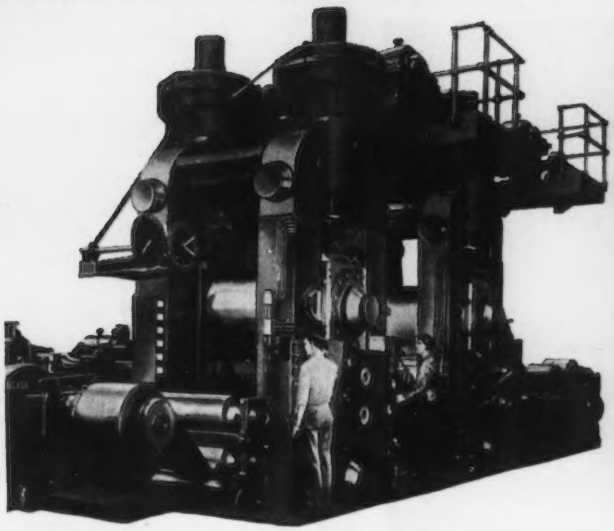
This mine, he asserted, is worked without modern equipment for the most part, but tungsten shipped from it has been bringing in an annual return of about 80 million cruzeiros since it was opened in 1942.

The scheelite ore in this mine is believed to be among the best in the world in tungsten content, with assays running between 70 and 75 pct. Price for this ore, however, has been only about 30,000 cruzeiros ($1650) a ton.

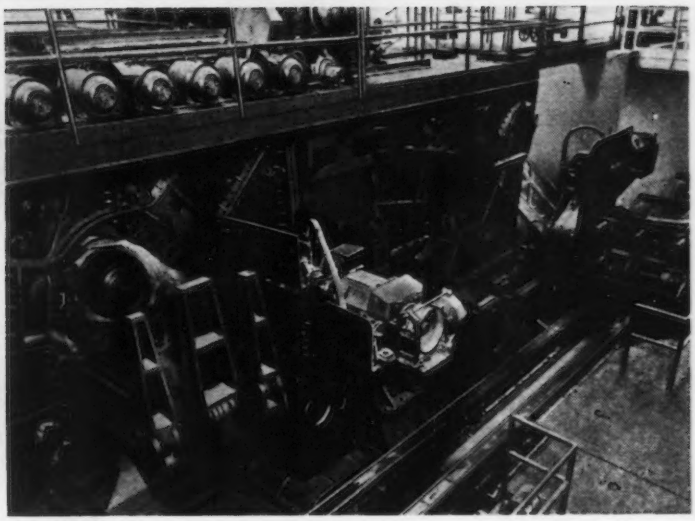
Engineer de Moraes said that there are some 100 deposits of scheelite in the Seridó region, but that not even half are being worked at all.

"Annual production, now about 1000 tons, could be increased tenfold," he said, "'if adequate capital were invested to enable mining

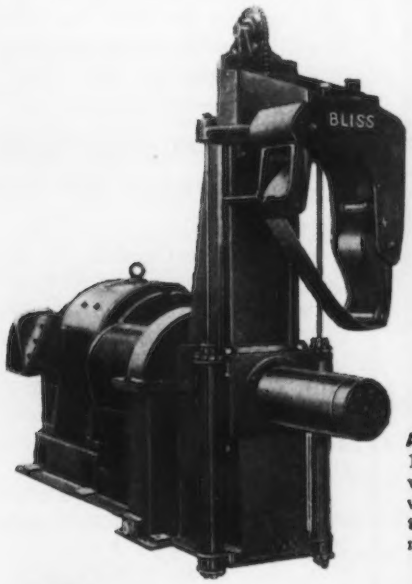
Stay Ahead with Bliss



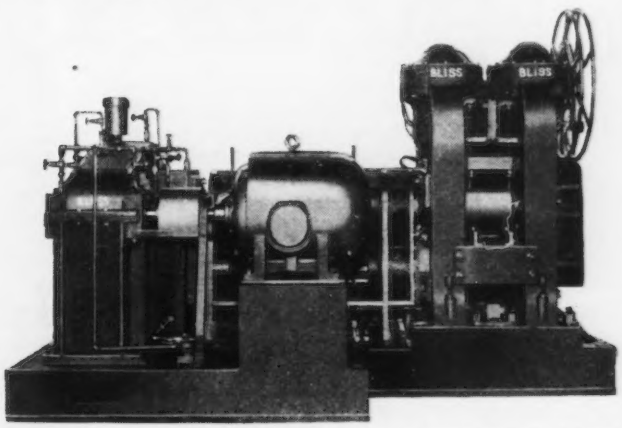
TIN PLATE—18" x 42½" x 42" two stand tandem temper pass mill for tin plate.



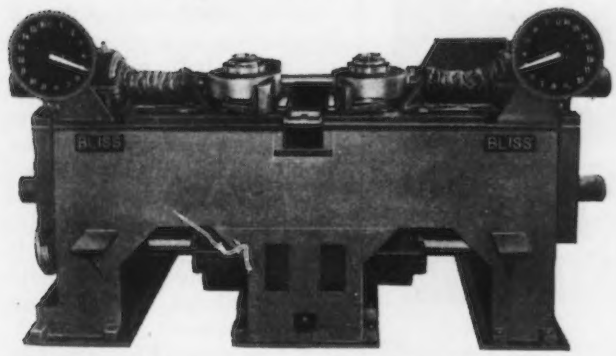
STEEL—Improved type hot strip downcoiler and upender for a Bliss 48" continuous strip mill.



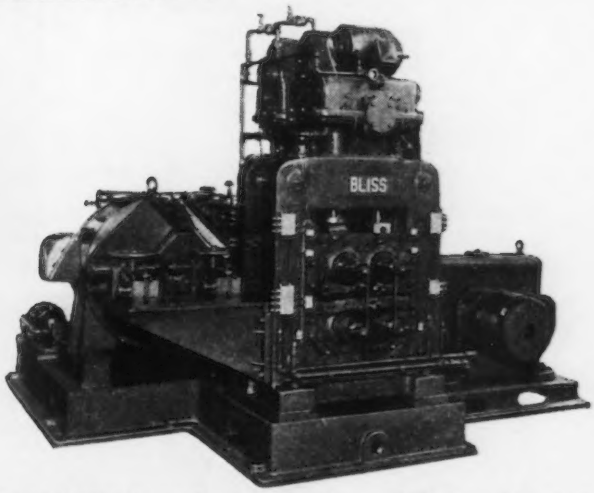
ACCESSORY—12" x 18" tension reel with vertical type belt wrapper has application in ferrous and non-ferrous fields.



COIN METAL—14" x 12" two-high mill used in government mints—typical of smaller Bliss mills.



ACCESSORY—20" Vertical edger for edging 8" to 40" wide slabs.



THIN GAGE METALS—3¼" x 9" x 8" Cluster Mill for cold reducing high carbon alloy and stainless steels from gages of .125" to .004".

E. W. BLISS COMPANY

450 AMSTERDAM AVENUE, DETROIT 2, MICHIGAN

STAY AHEAD WITH *Bliss*

Rolling Mills...Mechanical and Hydraulic Presses...Container Machinery

to be carried on through modern mechanized methods."

In a statement published in O Jornal of Rio on Mar. 19, Mr. de Moraes urged Brazil to make use of its huge deposits of rare metals, which, besides tungsten, include a majority of those on the U. S. strategic list.

He asserted that there are about 400 deposits of beryllium and tantalite in Brazil's northeast, of which only some 100 are being worked.

Development of electric power at the Paulo Afonso Falls on the São Francisco River at the border of the states of Alagôas and Bahia, would enable establishment of smelters for processing many of the rare ores found in Brazil's northeast, he added.

Assay laboratories were set up for the purposes of studying ores from Brazil's northeast by Fernando Costa, Minister of Agriculture during the war, and much of Brazilian mining exploration dates from that time.

Molybdenum Investigation Described in BM Report

Washington

• • • **An investigation** of molybdenum deposits in the Glacier Bay district at Muir Inlet, Alaska, is described in a report recently released by the Bureau of Mines. The Muir Inlet or Nunatak mineralized area, 78 airline miles north of Juneau, is surrounded on three sides by active glaciers.

A part of the Bureau's wartime mineral development program, the investigation was made in 1942 and 1943 under authority of the Strategic Minerals Act and later legislation to supplement the supply of strategic material.

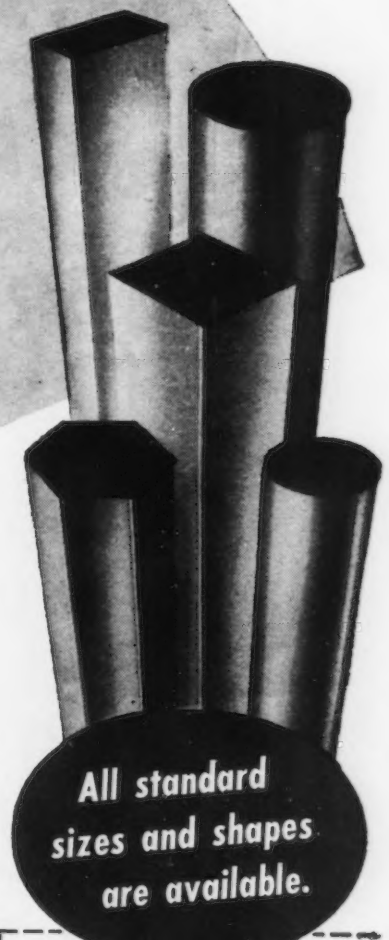
The report includes a discussion of the deposits, assay results, drill logs, area maps, and a plan and profile of the Nunatak area. It was prepared by R. S. Sanford, senior Bureau mining engineer, College Park, Md.; G. A. Apell, Bureau mining engineer, Minneapolis; and F. A. Rutledge, Bureau mining engineer, Juneau, Alaska.

A free copy of Report of Investigations 4421, "Investigation of Muir Inlet or Nunatak Molybdenum Deposits, Glacier Bay, Southeastern Alaska," may be obtained from the Bureau of Mines, 4800 Forbes St., Pittsburgh 13, Pa.

J&L STEEL

Forty-five independent machine shops, throughout the metal-working industry, have tested over *6,100 tons* of J&L "E" Steel in more than 100 applications. These shops report:

- **BETTER MACHINE FINISH**
- **LONGER TOOL LIFE**
- **HIGHER SPEEDS**
- **MACHINABILITY RATINGS UP TO 170**
- **BETTER RESPONSE TO FORMING AND COLD WORK**
- **HIGHER MAGNETIC PERMEABILITY**



All standard sizes and shapes are available.

For 50 years J&L has led in the development of free-cutting, cold-finished steels—both bessemer and open-hearth. Every new J&L steel introduced in this field has been a major contribution toward the lowering of the unit cost of machined steel parts. Now we offer you J&L "E", a bessemer grade steel with distinctly greater free-cutting efficiency.

During the development of J&L "E" Steel, at least four years were spent proving its qualities, in the field, under a great variety of machining conditions. In the course of our investigations, J&L metallurgists have accumulated considerable data and a large number of case histories. Therefore, we say with assurance that J&L "E" free-cutting steel opens the door to new production economies you never thought possible.

You will want complete information on this latest J&L steel development. Let us discuss the money-saving possibilities of J&L "E" Steel with you. The coupon is for your convenience.

Jones & Laughlin Steel Corporation
403 Jones & Laughlin Building
Pittsburgh 19, Pa.

I should like to have more information on J&L "E" Free-Cutting Bessemer Screw Stock. Please have your representative call.

Name_____

Title_____

Company_____

Address_____

_____

JONES & LAUGHLIN STEEL CORPORATION

From its own raw materials, J&L manufactures a full line of carbon steel products, as well as certain products in OTISCOLOY *and* JALLOY *(hi-tensile steels).*

PRINCIPAL PRODUCTS: HOT ROLLED AND COLD FINISHED BARS AND SHAPES • STRUCTURAL SHAPES • HOT AND COLD ROLLED STRIP AND SHEETS • TUBULAR, WIRE AND TIN MILL PRODUCTS • "PRECISIONBILT" WIRE ROPE • COAL CHEMICALS

PERSONALS

(CONTINUED FROM PAGE 109)

• **George G. Main** has been elected treasurer of the Westinghouse Electric Corp., Pittsburgh, succeeding L. H. Lund, who died. Mr. Main had served as assistant treasurer and assistant secretary since 1945. He joined Westinghouse in 1926.

• **James H. Rickey, Jr.** has been appointed production manager and **W. Carl Elswick,** purchasing agent of the Ironton Fire Brick Company, Ironton, Ohio.

• **C. S. Bygate** has been appointed assistant vice-president, Rockwell Mfg. Co., Pittsburgh. Mr. Bygate joined the company's Pittsburgh Equitable Meter division in 1943 and was later transferred to General Purchasing.

• **Paul E. Lees** has been named vice-president in charge of sales, Standard Tool Co., Cleveland. He had formerly been an executive of the Weldon Tool Co., Cleveland.

• **W. Murray Sanders** has been appointed to the New York staff of McKinsey & Co., as a marketing consultant. He had formerly been associated with H. H. Pike & Co.

• **James G. Dyett** has been elected president of the Hard Manufacturing Co., Buffalo, succeeding his father, **James H. Dyett,** who becomes chairman of the board. The new president had formerly been associated with the Arma Corp., Brooklyn.

• **Charles A. Freeman** has resigned from the A. P. Green Fire Brick Co. to form his own company at Canyon City, Colo. Mr. Freeman had been general manager of A. P. Green Engineering & Management Co., and had been connected with that organization in various sales and engineering capacities since 1928.

• **Lester Klempner** has been promoted to sales manager of the New York division, National Starch Products Inc., New York. Mr. Klempner had been field manager,

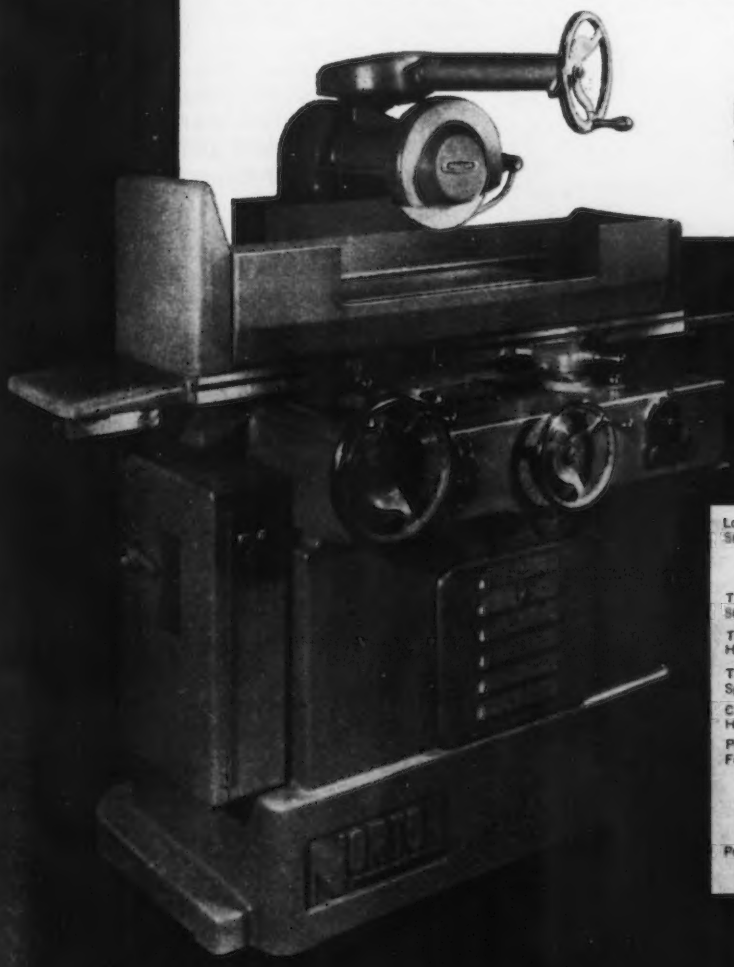
You'll Like It in the TOOL ROOM
You'll Like It on the PRODUCTION LINE
. . . The *new* NORTON 8"×24" SURFACE GRINDER

THIS new Norton surface grinder combines the qualities required for both the tool room and the production line. It is highly adaptable to frequent changes in set up—the condition encountered in the tool room. It has the ruggedness to deliver "all out"—as is demanded by the production line.

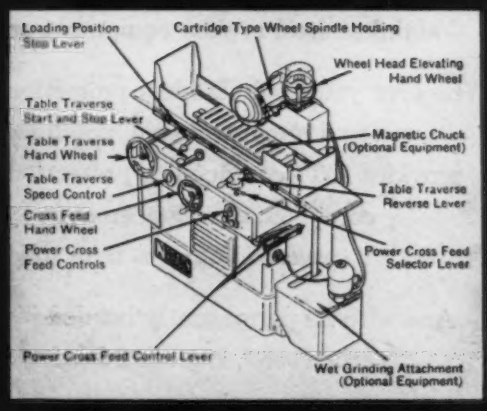
DESIGN HIGHLIGHTS—Horizontal and vertical ways protected from dust and grit. ★ Saddle well proportioned to give smooth cross feed throughout its full range of travel. Saddle ways and table ways pressure lubricated. ★ Work table operated by hand or hydraulic power with table speeds up to 70 feet per minute in hydraulic power. ★ Automatic hydraulic cross feed eliminates manual truing. ★ Grinding wheel spindle of the cartridge type, motor driven by flat belt; positive end thrust built into the spindle. ★ Hydraulic system is low pressure type with pump and all connections in the base so that any seepage drains back into the reservoir.

Write for new catalog
No. 190-2—no obligation

NORTON COMPANY
WORCESTER 6, MASS.
Distributors in All Principal Cities
M-575



Note the simplicity of controls and adjustments, and their location for the utmost convenience of the operator.



NORTON GRINDERS and LAPPERS

midwestern division of the company, with headquarters in Chicago.

• **Francis Bradley, Charles E. Brinley, Henry C. Bryans, Joseph N. Ewing, James E. Gowen, Edward Hopkinson, Jr., Lewis W. Metzger, Richard T. Nalle, Evan Randolph, Robert C. Shields, Marvin W. Smith** and **Henry H. Zeising** have been elected directors of the Midvale Co., Philadelphia.

• **Donald P. Felt** has been appointed assistant general freight agent of the Boston & Maine Railroad, with headquarters in Boston. Mr. Felt had formerly served as district freight agent of the road at Springfield, Vermont and traffic manager of the Springfield Terminal Railroad.

• **W. B. Flora** has been appointed field manager, budget sales, Associated Lines Sales Div., B. F. Goodrich Co., Akron, Ohio. Mr. Flora has been in that division since 1936, starting in the budget department and serving as budget manager in several cities.

• **F. S. Cornell** has been named assistant manager of the water heater division of the A. O. Smith Corp., Milwaukee. Mr. Cornell had served as assistant to the president of the company.

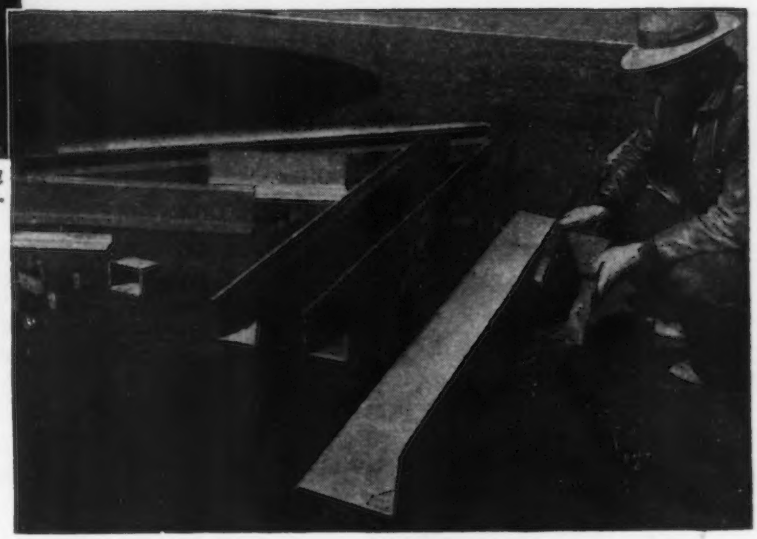
• **John C. Leitch** has been appointed Hancock Valve specialist covering the southeastern territory for Manning, Maxwell & Moore, Inc., Watertown, Mass., with headquarters in Atlanta. Mr. Leitch had formerly been connected with two subsidiaries of U. S. Steel Corp., National Tube and Columbia Steel, and the Babcock & Wilcox Tube Co. He joined Manning, Maxwell & Moore, Inc., early this year.

• **Walter A. Stewart,** trustee and former vice-president of American Optical Co., Southbridge, Mass., has been elected president of the company, succeeding **George B. Wells,** who has resigned after serving 12 years as president. Mr. Stewart has been connected with the optical industry for 27 years. He has been with American Optical since 1935.

• **Frederick L. Theurer** has retired as divisional director of the Milwaukee Paint Div., Pittsburgh

Your ROOF doesn't have to be Overhead!

Monel parapet flashing, siding, skylight trim and gutters. Installed on a coal-burning power plant in 1913, they are still in good condition.



These Monel gutters, base, cap and step flashings, down spout straps and eave boxes were installed on a chemical manufacturing plant, where they are successfully resisting destructive fumes, smoke and lowland dampness.

Now, with the new economical Monel Roofing Sheet, it is often cheaper to install a new Monel roof than to keep paying repairs for a leaky roof.

Tired of short-lived roofs and roofing parts?

Then turn to the metal that can end your problem . . . *Monel**.

Monel is an alloy consisting of approximately ⅔ nickel and ⅓ copper. Throughout industry it is known for its resistance to corrosion and rusting . . . severe stresses . . . wear . . . buckling and cracking at extreme temperatures.

It is doing hundreds of different jobs (*tough jobs*) in many fields, in many forms.

To you it offers a chance to cut your annual outlay for roof maintenance. Just look at the record. Monel roofing installations date back to 1910. Most of them have never required a penny for subsequent repairs.

No wonder Monel roofing is called "life-of-the-building" roofing.

Investigate Monel roofing for your own plant buildings. At a practical cost, you can have an entire roof of Monel, or Monel roofing parts such as drainage systems . . . flashings . . . skylight frames . . . ventilators . . . louvers . . . ducts . . . siding . . . expansion joints . . . copings . . . canopies . . . terrace-sheathing.

Send for our booklet, "ONE METAL ROOF"

It shows typical installations, tells about Monel's many advantages, cites long service records. Included in the booklet is a sample of Monel roofing sheet.

MONEL ROOFING

For the "Life-of-the-Building"

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Please send me a copy of "ONE METAL ROOF" and the sample of Monel Roofing Sheet.

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THE INTERNATIONAL NICKEL COMPANY, INC.

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67 Wall Street, New York 5, N. Y.

PERSONALS

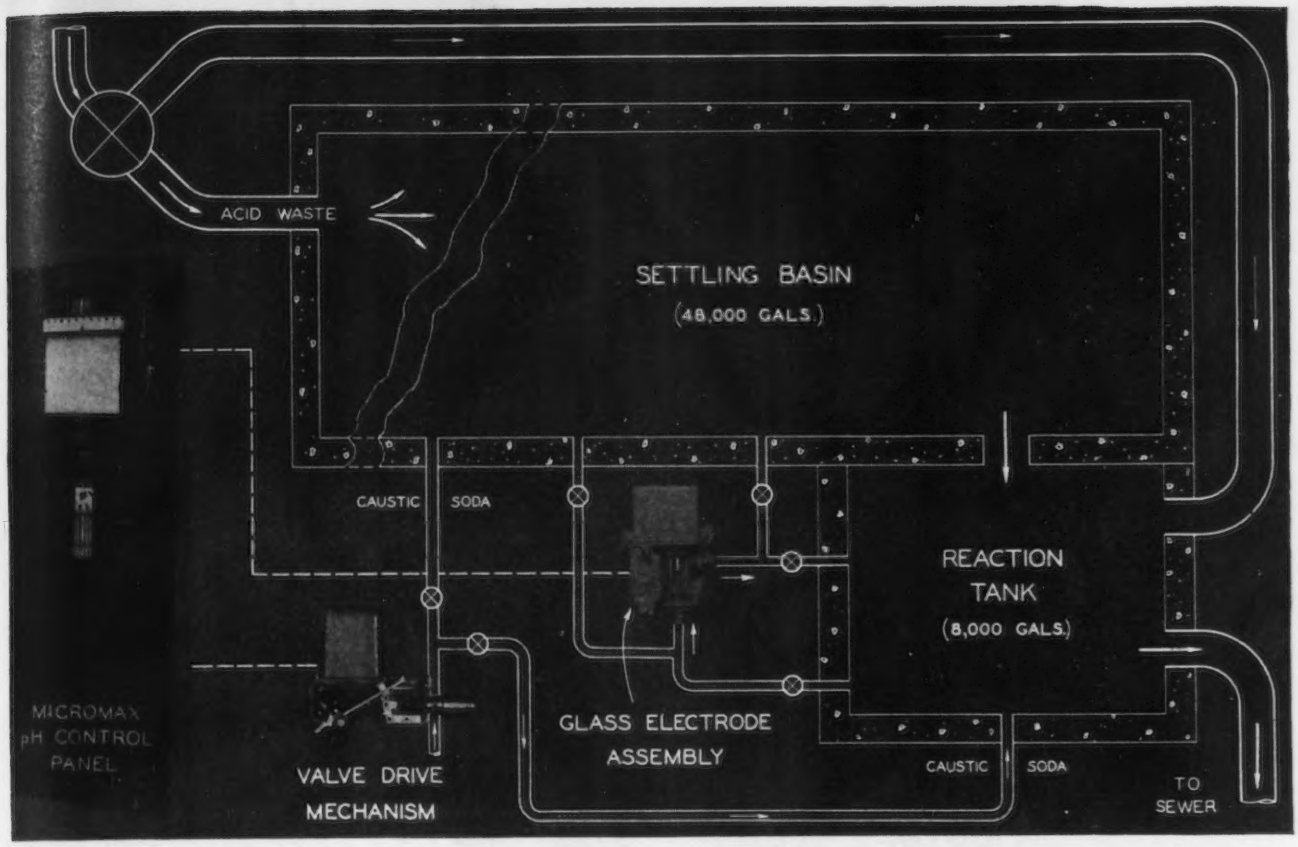
Plate Glass Co., Pittsburgh. Mr. Theurer joined the Patton Paint Co. of Milwaukee as assistant chemist in 1911, that company later becoming the nucleus of the paint division of Pittsburgh Plate Glass Co. **M. R. Randlett,** who has served as Mr. Theurer's assistant since 1945, succeeds him as divisional director. Mr. Randlett has been with Pittsburgh Plate Glass since 1922 when he joined the Houston warehouse staff.

• **H. G. Haake,** vice-president and district manager, Ceco Steel Products Corp., at Los Angeles, has been appointed manager in general charge of the company's operations on the Pacific Coast. W. F. **Norton** has been appointed assistant district manager of the Los Angeles office.

• **Roger W. Hofheins** has been appointed assistant to the vice-president, sales, in charge of product development of the Rigidized Metals Corp., Buffalo. Mr. Hofheins organized the Amphibian Car Corp. of Buffalo and has recently been active in automotive sales and engineering, and air-conditioning and air purification.

•**Robert L. Banes** has been appointed comptroller of the St. Louis Smelting & Refining Div., National Lead Co., New York. He has been with the company since 1923. **J. G. C. McNair** has been named to direct sales of white lead for National Lead, continuing to supervise sales of linseed oil. He joined the company in 1910 and has been director of linseed oil sales since early this year. **W. L. Heater** has been appointed general sales manager of the Baroid Sales division of National Lead Co., retaining his title as assistant to the general manager. **Edward J. Hagstette, Jr.,** formerly assistant to Mr. Heater, has been appointed manager of the products procurement department. He joined Baroid as a field engineer in the Gulf Coast division. **Arthur Langton** has been appointed manager of the advertising department in the Baroid Sales division. He has been with the company since 1935.

• **John F. Whalen** has been appointed assistant sales manager of the merchandise tools division of the Billings & Spencer Co., Hartford.



Schematic plan diagram of Micromax Automatic pH Control as applied to acid waste in Western Electric Co.'s new "controlled conditions" plant at Allentown, Pa. Waste is from metal-finishing and -plating operations.

Industrial Wastes Neutralized Dependably With Help of Micromax pH Control

Western Electric Co.'s new Allentown, Pa., plant includes not only an adequate waste-neutralizing system, but has that system so arranged that waste is accurately brought to a specific pH value before going to the outfall in the Lehigh River. Neutralization is carried out effectively by the well-known Micromax pH Control System, used for years in a wide variety of industrial applications. Highly sensitive and responsive, this rugged equipment provides dependable "round the clock" service, day after day.

Anyone with a waste neutralization problem is invited to make use of our unique service for determining its control possibilities. We call this service "controllability analysis." The culmination of many years of study and experience, this analysis actually predetermines, in detail, the conditions necessary for successful pH control in the individual plant. If the plant has a waste-treating layout already in use, analysis will predict within what limits pH can be held. And, if these limits are not satisfactory, we can usually suggest practical changes which will bring about the desired results. The analysis is quickly made, requires very little of your time, and can be done from information you supply us by mail. If you would like to see what "controllability analysis" will mean to you, just send for Bulletin or write to Leeds & Northrup Co., 4956 Stenton Ave., Phila. 44, Pa.

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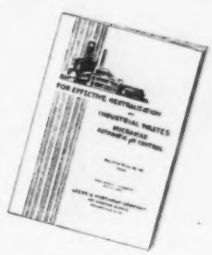
Send for your copy today!



This convenient publication, containing a number of pictures and illustrations, explains in simple, understandable language the many benefits of Micromax pH Control in "Effective Neutralization of Industrial Wastes."

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LEEDS & NORTHRUP CO.

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ECA Authorizations Hit New Weekly Low; Shipments Still Lag

Washington

• • • **With an authorization** total of $161 million, the Economic Cooperation Administration rounded out its first year with one of the lowest weekly amounts. Some $31 million was allotted for steel, machinery and industrial items.

At the end of 12 months, however, ECA approvals have passed the $5 billion mark, exclusive of shipping costs but including $224 million for China aid, $24 million for Korea, and $10 million for Trieste.

Industrial materials, exclusive of petroleum, accounted for 42 pct of the total authorizations. Roughly, this includes $400 million for machinery and equipment, $110 million for iron and steel, $100 million for motor vehicles and equipment, and a similar amount for other transportation equipment.

Industrial procurements have been stepped up, beginning with the last quarter, 1948. Shipments still continue to lag, about half the authorizations having been reported as actually shipped.

Procurements of American-made machinery and equipment will be increased by a quarter-billion over the next 12 months, ECA officials forecast. Authorized machine tool orders, which have heretofore been a disappointment to the industry, will be increased from last year's $30 million to from $45 to $50 million.

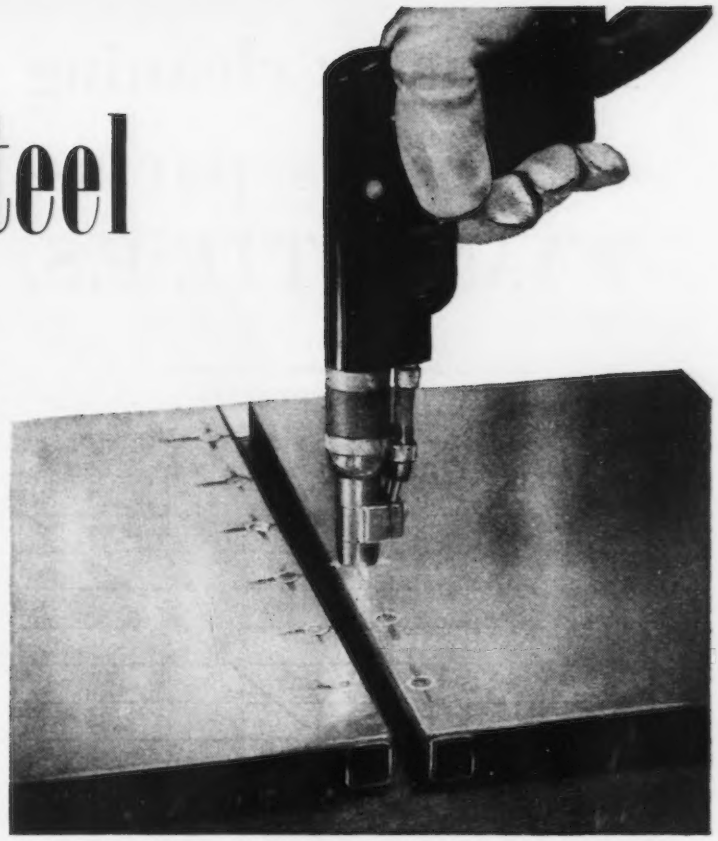
End of ECA's first year also found the agency as underwriter of 16 American foreign investments totaling $3.8 million of which four were for increasing industrial production in the United Kingdom.

These guaranties were granted to Jacobs Mfg. Co., ($400,000) for manufacture of drill chucks; to Godfrey L. Cabot, Inc., ($850,000) for production of carbon black; to General Time Instruments Corp., ($1,000,000) for manufacture of clocks and watches; and to Minneapolis-Honeywell Regulator Co., ($300,000) makers of recording and indicating instruments.

Aiming generally at raising overall Western European production to at least 30 pct above prewar, Administrator Paul Hoffman

Join Sheet Steel

WITH THE "HELIARC" Trade-Mark SPOT WELDING TORCH



Welds Stainless and Carbon Steels . . . Needs no forging pressure, works from one side only . . . Easy one-hand operation, just press the trigger

This new application of inert gas-shielded arc welding meets a long-felt need in the assembly of light gage metals because welding can be done from one side and no forging pressure is required. With the HELIARC HW-8 pistol-grip torch you can spot weld ducts, tubes, containers, brackets, handles or almost any structure. Sheets of mild steel, low alloy, or stainless steel, .030 to .064 in. thick can be joined in one to two seconds per weld. Also, thin sheets can be spot welded to underlying material of any thickness. Thus, corrosion resistant sheets can be joined to mild steel plate.

It's no trick to weld with the HELIARC HW-8 Spot Welding Torch. Just press the "muzzle" of the "gun" against the work and pull the trigger. An automatic timer controls the entire operation. A single hose assembly, standard length 25-ft., connects the torch to the operating equipment. A convenient push-button release on the torch barrel gives easy adjustment of the electrode. These features make the HELIARC HW-8 Spot Welding Torch an ideal production line tool, easy and natural to use and as light and portable as an oxy-acetylene blowpipe.

Call any LINDE office for additional information on this new spot welding process or any of the other LINDE methods for joining, cutting, forming and treating of metals.

Linde Trade-Mark

THE LINDE AIR PRODUCTS COMPANY

Unit of Union Carbide and Carbon Corporation

General Office: New York 17, N. Y. UCC Offices in Principal Cities

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says that, exclusive of western Germany, industrial output is now 14 pct over prewar.

Steel continued to set the production pace among the heavy industries, Hoffman adds, the output for 1948 totaling 40 million metric tons for ECA nations—30 pct more than in 1947. He has been advised that this will increase to at least 58 million tons by 1952.

Elects New Officers

Detroit

• • • **Arthur L. Bradley,** chief engineer of Wettlaufer Mfg. Co., Detroit, has been named president of the American Society of Body Engineers for the coming year.

Other officers are: Vice-president, Carl W. Cenzer, body development engineer for Hudson Motor Car Co.; secretary, Harold V. Atnip, assistant chief body draftsman for Chrysler Corp.; and treasurer, William K. Norwick, executive assistant to the general director of the engineering division of Fisher Body.

Trustees of the Society for the coming year are: I. Louis Carron, Carron Co.; Alfred H. Haberstump, Haberstump Harris Co.; Harry G. Garman, Fisher Body; Lynn A. Fill, Motor Products Corp.; Roy F. Anderson, Briggs Mfg. Co.; Harvey J. Anschuetz, Kaiser-Frazer Corp.; and Albert W. Arndt, Chrysler Corp.

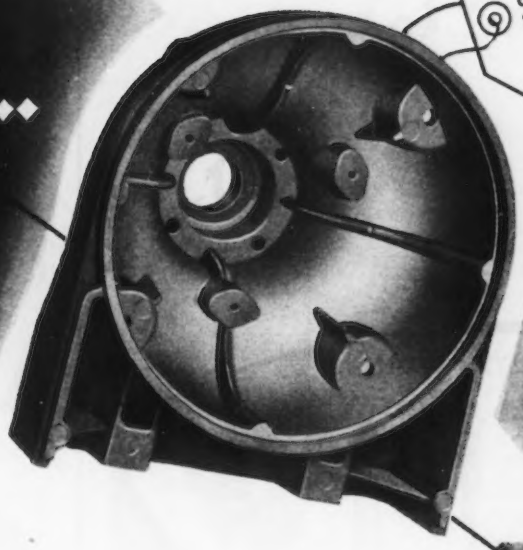
Enameled Steel Output Up

Washington

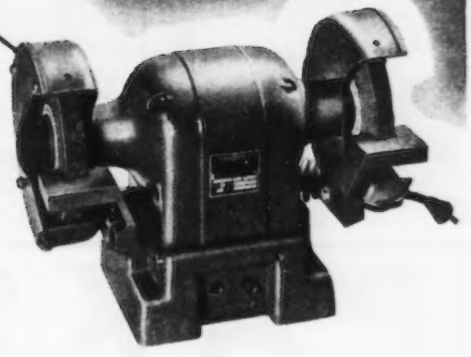
• • • **The value of** porcelain enameled steel plumbing fixtures shipped during the fourth quarter of 1948 increased approximately $1.6 million or 13 pct over the $11.6 million value reported for the third quarter of last year, according to the Porcelain Enamel Institute, Washington. The fourth quarter figure also represents an increase of $1.1 million or 9 pct over the $12.1 million figure reported for the fourth quarter of 1947.

Unit shipments of porcelain enameled steel bathtubs reported for the fourth quarter of 1948 increased by 21,000, or 24 pct over the 82,000 units shipped during the third quarter of the year. Porcelain enameled steel lavatories shipped during the fourth quarter showed a unit increase of 26,000 or 61 pct over the 42,000 units shipped during the third quarter.

fewer parts.. less labor



another successful product designed for ZINC DIE CASTING

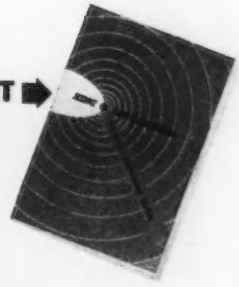


The use of zinc die castings for the motor end housings, the tool rests and the base of the Black and Decker bench grinder shown at the right greatly reduces machining and assembling time. By any other method of production, either a greater number of parts would be required, or machining costs would be excessive.

Take a look at the above zinc die cast motor end housing—two of them are used on each bench grinder. How else could this complex shape—with all of the integral assembly bosses and cored recesses — be produced economically? By designing specifically for die casting production, the weight of this housing has been minimized through the use of comparatively thin sections (see tag on casting) for an application of this type. Ample strength is assured by the judicious location of ribs on the inside walls of the casting.

This bench grinder is just one of many successful applications for zinc die castings in the field of small tools. Typical applications in other major industries will be covered in future advertisements in these pages.

SEND FOR THIS BOOKLET



ZINC DIE CASTINGS
in ever widening fields

This new booklet has 64 pages of photographs depicting zinc die castings in the assembly of a wide variety of products in many fields. Send for your copy today!

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FOR DIE CASTING ALLOYS

THE NEW JERSEY ZINC COMPANY, 160 Front St., New York 7, N. Y.

The Research was done, the Alloys were developed, and most Die Castings are based on
HORSE HEAD SPECIAL (99.99 + % Uniform Quality) ZINC

American Steel & Wire Forms New Division To Handle Sale of Springs

Cleveland

• • • **American Steel &** Wire Co. has announced formation of a separate mechanical spring sales division, the sixth independent division in the company's general sales department.

Charles W. Meyers

Charles W. Meyers was named manager of the new division, to be known as the spring products sales division. Robert D. Knight was appointed assistant manager.

Robert D. Knight

"The purpose of this unit is to aid the customer's specific technical and commercial problems. It is a directional step designed to offer maximum service to the trade and will handle the entire wire spring output from our two mills at Waukegan, Ill., and Worcester, Mass," H. M. Francis, vice president in charge of sales, pointed out.

Ideas Worth $2.5 Million

Schenectady

• • • **A total** of 17,629 employees of the General Electric Co. received cash awards totaling $277,218 during 1948 for suggested ideas leading to improvements in plant and office operations, A. D. Marshall, assistant secretary of the company recently announced.

The awards were made under the company's 43-year-old suggestion awards system and includes those given employees of G-E affiliated companies.

Mr. Marshall, who is also chairman of the suggestion committee, said approximately $2.5 million has been paid by the company in suggestion awards since the sug-

STAINLESS "SPOON" *for a Fish's Dinner*

Courtesy Wm. J. Hunt Mfg. Co.

Mackerel, stripers, sailfish, even trout go for this stainless Drone—a flashing, darting imitation of live bait, expertly designed to lure hungry heavyweights to a final meal.

Originally made of lacquered nickel-silver, these spoons are now made from stainless steel for lasting brilliance. First trials with stainless, however, were disappointing. The usual commercial grades gave trouble—buffing, even electro-polishing could not bring out the brilliance necessary for an effective lure. Again, these grades proved too soft to properly lock the hook—and hold it in the first lunge of a strike.

The Frasse recommendation was stainless steel of the same analysis—but rolled with a special temper. Result—a more rigid spoon with a properly seated hook, and a more appetizing gleam while trolling. Added advantages included production increases in stamping and forming, and reduced time cycle in polishing bath.

Frasse stocks stainless steel in every commercial form—bars and sheets, strip and tube—even valves, pipe fittings and electrodes. But Frasse stainless *engineering* service is equally handy—and just as useful. For stainless steels, and qualified engineering suggestion in their application—call Frasse. *Peter A. Frasse and Co. Inc., 17 Grand Street, New York 13, N. Y. (Walker 5-2200) • 3911 Wissahickon Avenue, Philadelphia 29, Pa. (Baldwin 9-9900) • 50 Exchange Street, Buffalo 3, N. Y. (Washington 2000) Jersey City • Syracuse • Hartford • Rochester • Baltimore.*

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NOW! Jumbo Stainless Sheets from Warehouse Stock!

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This new Frasse stock list supplement shows many new "unusual" items—*big* stainless sheets up to 72" x 144", *square* type 303 bars, *square* stainless tubing. You'll find it a handy source and reference book. Send for your copy today—no obligation.

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17 Grand Street, New York 13, N. Y.

Please send me a copy of your new stainless stock list supplement.

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gestion system was adopted in 1906.

Largest single award of $2285 went to Charles Bendig, an employee of the G-E Appliance and Merchandise Departments, Refrigerator Div. at Erie, Pa., for an idea to improve the finishing operation on refrigerator cabinets.

Cleveland's Production Rate Still Declining

Cleveland

• • • **The slowing tempo** of industrial production throughout Greater Cleveland which has been in evidence since late 1948 became more apparent in March when the total employment of 100 companies covered by the monthly survey of the Chamber of Commerce declined slightly more than 3 pct as announced by J. W. Vanden Bosch, chamber analyst.

Nearly two-thirds of the 100 companies showed employment declines of greater or less degree during the month, Mr. Vanden Bosch said.

"From the 100 plant total it can be estimated that 198,000 hourly paid employees are working in all Greater Cleveland manufacturing establishments. One month ago the figure was 205,000 and at the end of March, 1948, it was 212,000.

"Small employment increases were noted in the chemical and allied industries, and the paper and printing group; otherwise the industrial groups were lower at the end of the month.

"The average working week in March, 38.9 hr, was down 7/10 from February and compares with a postwar average of 40 to 41. The hiring rate for unskilled labor remains steady at $1.099.

"The April outlook is uncertain as 15 plants anticipate lower employment as compared with 8 which foresee increases and 43 which anticipate no particular change.

"The 100 plants covered by the Chamber survey reported 103,047 on the payroll on Mar. 28, and 106,460 on Feb. 24. At the end of March one year ago 110,355 were on the payrolls of the same companies. Included in the current total are 1800 in one company which is affected by a strike.

"The employment index, based on the average of 1939 as 100, stood at 157.6 on Mar. 28."

Need Pressings?

Die-cut and pressed shapes from By-Products Steel Co. relieve you of those initial operations. You get right to work finishing the parts, saving considerable time. We have the heavy presses and, in many cases, the very dies needed to make the shapes.

You also save money, because you pay freight only on the finished pieces; scrap is held here where its value is highest. Bulletin 270, containing photographs and descriptions of some By-Products Steel Plate Shapes will be sent on request. For a quotation on your requirements, send blueprints to By-Products Steel Co., Division of Lukens Steel Company, 413 Strode Ave., Coatesville, Pa.

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STEEL PLATE SHAPES

FLAME-CUT ★ SHEARED ★ PRESSED ★ BENT ★ BLANKED ★ WELDED

Suggests Qualifications For Engineer Membership

New York

• • • **Though final action** has not yet been taken, the committee on Professional Recognition of Engineers' Council for Professional Development is well on the way to agreement on a recommendation to national engineering societies that membership grades and minimum qualifications for membership be standardized.

Three essential grades of membership are contemplated: Member, Associate Member, and Student Member, with two other grades suggested for those societies that may wish to adopt them: Fellow and Affiliate.

A Member shall have had (1) an engineering degree, with at least 4 years of increasingly important engineering experience indicative of growth in engineering competency and achievement and of a satisfactory character, at least 2 years of which shall have been in responsible charge of engineering work. Or, (2) if not a graduate he shall have had at least 10 years of engineering experience satisfactory to the society. A license to practice professional engineering, or the passing of an examination prescribed by the governing board of the engineering society involved may be accepted as qualifying experience. Teaching may also be considered as qualifying experience. If not an engineering graduate, graduation from a natural or physical science curriculum may be acceptable, though such training should preferably qualify a man for Associate Membership.

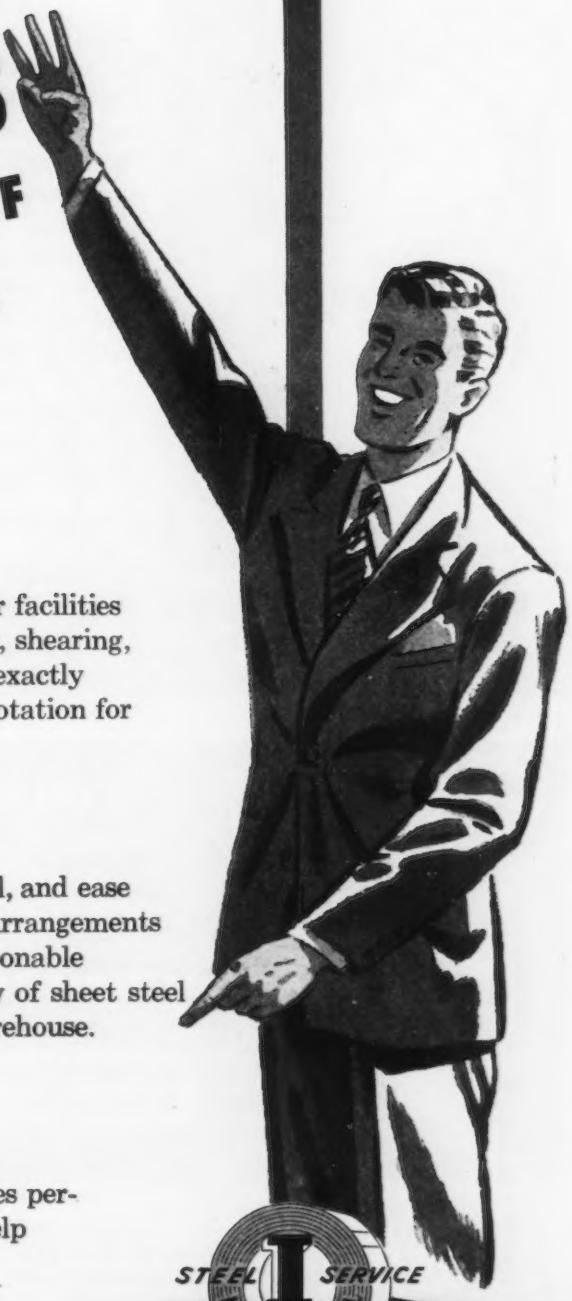
An Associate Member shall be merely a graduate of an engineering or physical science curriculum, with no experience required; or, if not a graduate, should have had at least 6 years of professional experience.

A Student Member shall be an undergraduate or graduate engineering student in the professional field of the society.

A Fellow is purely an honorary grade, for engineers of distinction for which the member makes no application.

The Affiliate grade would apply to those who are not professional engineers, but who cooperate with

3 International SERVICES FOR USERS OF SHEET STEEL



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With our present inventory and our facilities for coil-slitting, de-coiling, flattening, shearing, edging, and pickling, we can provide exactly the steel sheets you need. Get our quotation for your steel, and these services.

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engineers in the advancement of engineering knowledge and practice.

Comment on the above suggestions is invited by the secretary of ECPD, 29 W. 39th St., New York 18, N. Y. A final meeting of the committee to discuss the subject is planned for late May.

Enamelers To Stress Sales

Washington

• • • **The third annual** Sales Management Conference of the Porcelain Enamel Institute will be held June 24 at the Carter Hotel, Cleveland. Theme of the morning program of the one-day conference will be "How to Sell." The afternoon session will be devoted to "How to Use Porcelain Enamel as a Selling Tool."

A tentative program for the conference was drawn up at a meeting of the Sales Management Conference planning committee, held Mar. 3 at Hotel Stevens, Chicago. Presiding at this meeting was C. P. Lohman, Pemco Corp.

Model Plane Builders Meet

Detroit

• • • **Model airplane** builders throughout the country will assemble in Detroit, August 22-29 for the Third International Model Plane contest sponsored by Plymouth Motor Corp. Last year, according to Plymouth officials, a record crowd of 62,000 attended the final contest at Detroit. During the past spring and summer nearly a million spectators watched 208 Plymouth dealer - sponsored contests in which about 25,000 model builders participated.

AAC Members Visit Plants

Detroit

• • • Twenty-two members of the Anglo-American Council on Productivity and three staff consultants were visitors at the Ford Motor Co., Apr. 4.

The visitors were guests of E. R. Breech, executive vice-president, who is a member of the Council.

During the afternoon one group visited Thompson Products, Inc.; another went to Detroit Gasket & Mfg. Co. and a third group visited the Ex-Cell-O Corp.

Steel Users to Benefit From Price Reductions

Los Angeles

• • • **Many fabricators** and other buyers of steel in this area show more optimism in regard to business volume than at any time in recent months as they watch trends marking a change from a sellers' to a buyers' market.

Following announcements of price drops here by Kaiser Co., Inc., and of more recent cuts in the East by Inland Steel, Carnegie-Illinois Steel Corp. and National Tube Co., most buyers indicated that although the effect of the eastern cuts on limited items might not be felt here immediately.

Morris Pendleton, president of Plomb Tool Co., and a close observer of the overall steel market, predicts that when prices are levelled off, western steel users will benefit more percentage wise on cost cuts than will those in the East. He expects changes designed especially to help California fabricators compete more easily with mid-western firms in out-of-state areas where transit rates are involved. He believes f.o.b. mill prices here should be below those for steel shipped in with rail prices added to f.o.b. costs of the East.

Several heavy equipment manufacturers indicated they believe any real drops in steel prices would have the eventual effect of increasing volume. However, no immediate change in demand would be anticipated.

Fabricators, who are studying the possible effects of drops in scrap prices on overall steel prices, believe that any major cuts in prices will loosen up some of the major jobs which have been planned but which have been shelved to await drops in building prices.

It is reasoned by some buyers that since scrap is now costing steel producers about $6.00 per net ton less than it did 2 months ago, it should cost about $6.40 less to produce a net ton of finished steel. This calculation is made on the assumption that the furnace charge is 80 pct scrap and the yield of finished products is 75 pct.

If this reasoning is correct, producers could cut $6.40 from the current western prices of from $76 to $86 per ton for shapes to between $69.60 and $79.60 and still realize the same mill net.

Second Quarter Machine Tool Sales Volume Down; New Orders Lag

• • • Authoritative industry sources predicted this week that second quarter machine tool sales volume will not reach the first quarter total of $75 million, primarily because of a lag in domestic orders.

First quarter sales of $75 million, it was pointed out, mark an unusually good first quarter for the industry, topping 1948 first quarter sales of $72 million.

New firm orders in March showed a slight increase over February, and sales reports from some segments of the industry indicate good buying, but domestic demand is generally at a low ebb.

Foreign orders accounted for about 40 pct of the first quarter volume compared with about 7 pct for the corresponding quarter of 1948, which would seem to indicate that ECA business arrived at a rather propitious time for the industry.

Demand for heavy machinery in many sectors is brisk, but interest in standard machines is lagging in many cases.

In the meantime, the secondary surplus of wartime machine tools continues to develop. The number of auctions and sales is increasing and complete plants are being sold by professional auctioneers, machine by machine.

On other fronts, trade sources reported that the government's renegotiation law (THE IRON AGE, Apr. 7) will cost the government more than it will put in the treasury. This statement is based on the fact that the government business will be placed in a highly competitive machine tool market. On the other hand, the law will cost the machine tool industry plenty of money, for auditors, accountants, etc., even if it doesn't return a dime to the public coffers.

In Detroit the volume of new business continues to lag substantially behind last year's totals based on a recent survey of local machine tool suppliers. A few firms indicate a slight edge over a year ago, but even with the bolstering effect of a better-than-fair volume of replacement sales, the current figures are often substantially less than a year ago.

Demand for Heavy Machinery Although Little Interest in Standard Machines

° ° °

There is still nothing definite on a Studebaker transmission that was reported several weeks ago. Both the Dodge and Ford engine programs, frequently the basis for local rumors, are quiet. While the Detroit tank arsenal is reported to be definitely interested in some new equipment, no orders have been placed, according to local sources.

In the East, although government spending has brought some business to some New England machine tool builders, and the aircraft industry occasionally buys something, there has been very little change in the general volume of bookings so far this year.

A majority of builders still classify business as dull, and earnings for the first quarter approximately the same as for the same period of 1948. However, those tool makers that have taken on sidelines have done fairly well financially.

Arnold Brown, vice-president, Brown & Sharp Mfg. Co., says he does not think the lack of domestic business is caused by customers having all the machine tools they need. Slow business in some lines and general hesitancy as to where the national economy is heading are holding up machine tool orders, he believes. People, he says, are being very cautious.

In Cleveland four summer sales conferences, designed expressly as refresher courses in sales engineering for the machine tool industry were announced by L. D. McDonald, president, National Machine Tool Builders' Assn. in cooperation with Cornell University, Western Reserve University, Dartmouth College and Purdue University.

The conferences are an expansion of the program started last year, when a single course, limited to 50 men, was presented at Cornell. It was the first course of its kind ever devoted exclusively to the sale of capital goods equipment.

As last year, the NMTBA and the American Machine Tool Distributors' Assn. have each named a committee jointly to develop the program, which is to be the same at each conference. Each conference will last 5½ days, beginning Monday morning and ending Saturday noon. The dates are as follows: Cornell University, Ithaca, N. Y., July 11-16; Western Reserve University, Cleveland, July 25-30; Dartmouth College, Hanover, N. H., Aug. 8-13; and Purdue University, Lafayette, Ind., Aug. 15-20.

The conferences are open only to sales managers, district managers and salesmen who are employees of members of the National Machine Tool Builders' Assn. and the American Machine Tool Distributors' Assn.

The curriculum will be based on the lectures, problems and discussions during the course at Cornell in July 1948, and on a textbook which is being published at this time by Prof. Harry J. Loberg, who is in charge of the conferences. Professor Loberg is head of the Industrial and Administrative Engineering Dept., College of Engineering, Cornell University.

A faculty of resident professors will be selected at each of the host universities, cooperating with members of the industry under the general direction of Professor Loberg. Application forms will be distributed by the two associations to their members within the month. Attendance at each of the conferences will be limited to the available housing assigned.

Whitey sez:

"Products and services that rate 'top billing' are those that do what they're *supposed* to do, and do that well. Because of their performance, our products have won this rating."

MAURATH, INC. 21810 MILES AVENUE
CLEVELAND 22, OHIO

NONFERROUS METALS

. . . News and Market Activities

Latest Price Reductions Are Recorded On Zinc and Copper

New York

• • • **Further price** reductions were made in nonferrous metals last week. At that time zinc was offered to the market at a reduction of 1 cent, but early this week the price at East St. Louis dropped another cent making the price there 13 cents on Apr. 19. Copper was down 2 cents last week. These reductions originated in custom smelting circles. Prices of aluminum ingots were also reduced by from ¼ cent to 1 cent a lb.

The zinc reduction early this week was the fourth drop in the past 3 weeks. These declines have lowered the price by 4½ cents from the peak of 17½ cents for Prime Western at East St. Louis. Despite the decreases the market continues quiet.

The drop in the copper price was the first major price development in the metal since the 2¢ increase on Aug. 3, 1948. A custom smelter had already dropped the price by ¼¢ on Mar. 30. Early this week no major producer of copper had brought its price down to the competitive level.

It is learned that the copper market is inactive, as very little tonnage is moving. Brass mills had not brought down their mill products prices early this week, as it is understood that further developments in the price of copper are being expected. Some factors in the market point to the continuing high level of industrial activity with the expectation that buyers may be forced back into the market by the exhaustion of present inventories.

Brass mill business is very poor due to a sharp decline in order volume which started 3 weeks ago. One mill estimates that its order tonnage is only 30 pct as heavy as a year ago. Before that time, order volume was running 50 to 55 pct as high. There have been several recent mill price reductions due to the dropping zinc price. Mill products consumers are fearful now that copper price action may make further reductions necessary.

Zinc Cut Fourth Time Within 3 Weeks But Market Is Still Seen Quiet

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There were only a few reductions in the prices of scrap metals last week because these reductions had already been anticipated. Refineries, however, reduced their buying prices for copper scrap by ½¢, bringing down No. 1 copper and wire to 15.50¢. Dealers' copper and zinc buying prices have also been reduced. Brass scrap grades have not been affected.

Marked strengthening of the lead market developed last week with news of the additional funds available for stockpile buying. Smelters have reduced the smelting charge from as much as $140 to a range of $80 to $90. Some smelters expect the price of lead to continue at 15¢, but others expect additional reductions.

So far there has been no indication of the extent of the forthcoming union demand on the brass mills, except for the 25 pct increase proposed by the International Union of Mine, Mill and Smelter Workers. It is learned that the proposals of other unions will be more in line with the realities of the current business situation. The officials of the Progressive Metalworkers Council, the United Auto Workers and the Mine and Smelter Workers are expected to meet within a week in order to clarify their position and attempt to agree on a program. There is no doubt that fringe benefits will constitute their major position. But one mill estimates that fringe benefits already received account for 22 cents an hour.

Primary capacity for slab zinc production in 1949 will be 23 pct greater than in 1940, according to a study of figures supplied by producers and reported by Howard I. Young, president, American Zinc, Lead and Smelting Co. at the recent annual meeting of the American Zinc Institute in St. Louis. Capacity at the end of the year will reach 938,000 tons, compared with 762,000 tons in 1940. Estimated production for the year is set at 869,000 tons, plus about 60,000 tons of secondary. The largest expansion of primary zinc capacity has been in the Southwest which increased 50 pct in the 9-year period. Western capacity increased 32 pct.

The study also shows that the total annual capacity of horizontal retort plants has decreased at the rate of 11,000 tons a year. Electrolytic, electrothermic and continuous retort plant capacity has been increased by 187,000 tons, 50 pct above 1940 capacity.

Reports of expansion in the capacity of plants located in Canada, Australia, Africa and South America, and rehabilitation of plants in Germany, France and Belgium have convinced Mr. Young that by the end of 1950 or early in 1951, foreign production will be adequate to supply substantially all foreign requirements for slab zinc.

Nonferrous Metals Prices

	Apr. 13	Apr. 14	Apr. 15	Apr. 16	Apr. 18	Apr. 19
Copper, electro, Conn.	23.25-23.50	21.50-23.50	21.50-23.50	21.50-23.50	21.50-23.50	21.50-23.50
Copper, Lake, Conn.	23.625	23.625	23.625	23.625	23.625	23.625
Tin, Straits, New York	$1.03	$1.03	$1.03	$1.03	$1.03	$1.03
Zinc, East St. Louis	15.00	14.00	14.00	14.00	14.00	13.00
Lead, St. Louis	14.80	14.80	14.80	14.80	14.80	14.80

Primary Metals

(Cents per lb, unless otherwise noted)

Aluminum, 99+%, 10,000 lb, freight allowed	17.00
Aluminum pig	16.00
Antimony, American, Laredo, Tex.	38.50
Beryllium copper, 3.75-4.25% Be dollars per lb contained Be	$24.50
Beryllium aluminum 5% Be, dollars per lb contained Be	$52.00
Bismuth, ton lots	$2.00
Cadmium, del'd	$2.00
Cobalt, 97-99% (per lb)	$1.80 to $1.87
Copper, electro, Conn. Valley	21.50 to 23.50
Copper, lake, Conn. Valley	23.625
Gold, U. S. Treas., dollars per oz.	$35.00
Indium, 99.8%, dollars per troy oz.	$2.25
Iridium, dollars per troy oz.	$100 to $110
Lead, St. Louis	14.80
Lead, New York	15.00
Magnesium, 99.8+%, f.o.b. Freeport, Tex.	20.50
Magnesium, sticks, carlots	34.50
Mercury, dollars per 76-lb flask, f.o.b. New York	$87 to $90
Nickel, electro, f.o.b. New York	42.93
Palladium, dollars per troy oz.	$24.00
Platinum, dollars per troy oz.	$72 to $75
Silver, New York, cents per oz.	71.50
Tin, Grade A, New York	$1.03
Zinc, East St. Louis	13.00
Zinc, New York	13.70
Zirconium copper, 10-12 pct Zr, per lb contained Zr	$12.00

Remelted Metals

Brass Ingot

(Published prices, cents per lb delivered, carloads)

85-5-5-5 ingot		
No. 115	17.50*	18.50
No. 120	17.00*	18.00
No. 123	16.50*	17.50
80-10-10 ingot		
No. 305	....	23.75
No. 315	....	20.75
88-10-2 ingot		
No. 210	....	30.50
No. 215	....	27.50
No. 245	21.00*	21.75
Yellow ingot		
No. 405	14.50*	16.00
Manganese bronze		
No. 421	....	21.50

* F.o.b. Philadelphia.

Aluminum Ingot

(Cents per lb, lots of 30,000 lb)

95-5 aluminum-silicon alloys	
0.30 copper, max.	21.00-21.50
0.60 copper, max.	20.50-21.00
Piston alloys (No. 122 type)	18.00-18.50
No. 12 alum. (No. 2 grade)	16.75-17.25
108 alloy	17.25-17.75
195 alloy	18.50-19.00
13 alloy	20.50-21.00
AXS-679	18.00-18.50

Steel deoxidizing aluminum, notch-bar granulated or shot

Grade 1—95 pct-95½ pct	18.25-18.50
Grade 2—92 pct-95 pct	17.25-17.50
Grade 3—90 pct-92 pct	16.25-16.50
Grade 4—85 pct-90 pct	15.75-16.00

Electroplating Supplies

Anodes

(Cents per lb, freight allowed, in 500 lb lots)

Copper	
Cast, oval, 15 in. or longer	38.64
Electrodeposited	34⅝
Rolled, oval, straight, delivered	37.34
Ball anodes	38⅝
Brass, 80-20	
Cast, oval, 15 in. or longer	35⅞
Zinc, oval, 99.99	
Ball anodes	24.00
Nickel 99 pct plus	
Cast	59.00
Rolled, depolarized	60.00
Cadmium	$2.15
Silver 999 fine, rolled, 100 oz. lots, per troy oz, f.o.b. Bridgeport, Conn.	79

Chemicals

(Cents per lb, f.o.b. shipping point)

Copper cyanide, 100 lb drum	48.00
Copper sulfate, 99.5 crystals, bbls	9.10
Nickel salts, single or double, 4-100 lb bags, frt. allowed	18.00
Nickel chloride, 300 lb bbl	24.50
Silver cyanide, 100 oz. lots, per oz.	59
Sodium cyanide, 96 pct domestic 200 lb drums	19.25
Zinc sulfate, crystals, 22.5 pct, bags	
Zinc sulfate, 25 pct, granules, bbls, frt allowed	

Mill Products

Aluminum

(Base prices, cents per pound, base 30,000 lb, f.o.b. shipping point, freight allowed)

Flat Sheet: 0.188 in., 2S, 3S, 26.9¢; 4S, 61S-O, 28.8¢; 52S, 30.9¢; 24S-O, 24S-OAL, 29.8¢; 75S-O, 75S-OAL, 36.3¢; 0.081 in., 2S, 3S, 27.9¢; 4S, 61S-O, 30.2¢; 52S, 32.3¢; 24S-O, 24S-OAL, 30.9¢; 75S-O, 75S-OAL, 38¢; 0.032 in., 2S, 3S, 29.5¢; 4S, 61S-O, 33.5¢; 52S, 36.2¢; 24S-O, 24S-OAL, 37.9¢; 75S-O, 75S-OAL, 47.6¢.

Plate: ¼ in. and heavier: 2S, 3S, F, 23.8¢; 4S-F, 26¢; 52S-F, 27.1¢; 61S-O, 26.6¢; 24S-F, 24S-FAL, 27.1¢; 75S-F, 75S-FAL, 33.9¢.

Extruded Solid Shapes: Shape factors 1 to 4, 35.1¢ to 66¢; 11 to 13, 36.1¢ to 78¢; 23 to 25, 38.2¢ to $1.07; 35 to 37, 45.7¢ to $1.65; 47 to 49, 67.5¢ to $2.41.

Rod, Rolled: 1.064 to 4.5 in., 2S-F, 3S-F, 34¢ to 30.5¢; Cold-finished, 0.375 to 3.5 in., 2S, 3S, 36.5¢ to 32¢.

Screw Machine Stock: Drawn, ⅛ to 11/32 in., 11S-T3, R317-T4, 49¢ to 38¢; cold-finished, ⅜ to 1½ in., 11S-T3, 37.5¢ to 35.5¢; ⅜ to 2 in., R317-T4, 37.5¢ to 34.5¢; rolled, 1 9/16 to 3 in., 11S-T3, 35.5¢ to 32.5¢; 2⅛ to 3⅝ in., R317-T4, 33.5¢ to 32.5¢. Base 5000 lb.

Drawn Wire: Coiled, 0.051 to 0.374 in.: 2S, 36¢ to 26.5¢; 52S, 44¢ to 32¢; 56S, 47¢ to 38.5¢; 17S-T4, 50¢ to 34.5¢; 61S-T4, 44.5¢ to 34¢; 75S-T6, 76¢ to 55¢.

Magnesium

(Cents per lb, f.o.b. mill, freight allowed Base quantity 30,000 lb)

Sheet and Plate: Ma, FSa, ¼ in., 54¢-56¢; 0.188 in., 56¢-58¢; B & S gage 8, 58¢-60¢; 10, 59¢-61¢; 12, 63¢-65¢; 14, 69¢-74¢; 16, 76¢-81¢; 18, 84¢-89¢; 20, 96¢-$1.01; 22, $1.22-$1.31; 24, $1.62-$1.75. Specification grade higher.

Extruded Round Rod: M, diam. in., ¼ to 0.311, 58¢; ½ to ¾, 46¢; 1¼ to 1.749, 43¢; 2½ to 5, 41¢. Other alloys higher.

Extruded Square, Hex. Bar: M, size across flats, in., ¼ to 0.311, 61¢; ½ to 0.749, 48¢; 1¼ to 1.749, 44¢; 2½ to 4, 42¢. Other alloys higher.

Extruded Solid Shapes, Rectangles: M, in weight per ft, for perimeters of less than size indicated, 0.10 to 0.11 lb. per ft, per. up to 3.5 in., 55¢; 0.22 to 0.25 lb per ft, per. up to 5.9 in., 51¢; 0.50 to 0.59 lb per ft, per. up to 8.6 in., 47¢; 1.8 to 2.59 lb per ft, per. up to 19.5 in., 44¢; 4 to 6 lb per ft, per. up to 28 in., 43¢. Other alloys higher.

Extruded Round Tubing: M, wall thickness, outside diam, in., 0.049 to 0.057, ¼ to 5/16, $1.14; 5/16 to ⅜, $1.02; ½ to ⅝, 76¢; 1 to 2 in., 65¢; 0.065 to 0.082, ⅜ to 7/16, 85¢; ⅝ to ¾, 62¢; 1 to 2 in., 57¢. 0.165 to 0.219, ⅜ to ¾, 54.5¢; 1 to 2 in., 53¢; 3 to 4 in., 49¢. Other alloys higher.

Nickel and Monel

(Base prices, cents per lb, f.o.b. mill)

	Nickel	Monel
Sheets, cold-rolled	60	47
Strip, cold-rolled	66	50
Rods and shapes		
Hot-rolled	56	45
Cold-drawn	56	45
Angles, hot-rolled	56	45
Plates	58	46
Seamless tubes	89	80
Shot and blocks	..	40

Copper, Brass, Bronze

(Cents per pound, freight prepaid on 200 lb)

	Extruded Shapes	Rods	Sheets
Copper	36.78	....	37.18
Copper, hot-rolled	....	33.03	....
Copper, drawn	....	34.28	....
Low brass	38.08*	....	35.17
Yellow brass	36.78*	....	33.77
Red brass	38.55*	....	35.64
Naval brass	33.94	32.69	38.63
Leaded brass	....	28.22	....
Commercial bronze	39.29*	....	36.63
Manganese bronze	37.53	36.03	42.13
Phosphor bronze, 5 pct	....	....	56.05
Muntz metal	33.49	32.24	36.68
Everdur, Herculoy, Olympic, etc.	....	40.67	41.73
Nickel silver, 10 pct	45.97	46.44	44.22
Architectural bronze	32.26	....	....

* Seamless tubing.

Scrap Metals

Brass Mill Scrap

(Cents per pound; add ½¢ per lb for shipments of 20,000 to 40,000 lb; add 1¢ for more than 40,000 lb)

	Heavy	Turnings
Copper	21⅛	20⅝
Yellow brass	18	17⅛
Red brass	19⅜	18⅝
Commercial bronze	19⅞	19½
Manganese bronze	17¾	16⅞
Leaded brass rod ends	17¾	

Custom Smelters' Scrap

(Cents per pound, carload lots, delivered to refinery)

No. 1 copper, wire	15.50
No. 2 copper, wire	14.50
Light copper	13.50
Refinery brass	13.00*

* Dry copper content.

Ingot Makers' Scrap

(Cents per pound, carload lots, delivered to producer)

No. 1 copper, wire	15.50
No. 2 copper, wire	14.50
Light copper	13.50
No. 1 composition	11.00
No. 1 comp. turnings	10.50
Rolled brass	9.50
Brass pipe	10.00
Radiators	9.50
Heavy yellow brass	8.50
Aluminum	
Mixed old cast	9.50
Mixed old clips	9.50
Mixed turnings, dry	8.00
Pots and pans	9.50
Low copper	13.00

Dealers' Scrap

(Dealers' buying prices, f.o.b. New York in cents per pound)

Copper and Brass	
No. 1 heavy copper and wire	14¼—14½
No. 2 heavy copper and wire	13¼—13½
Light copper	12¼—12½
Auto radiators (unsweated)	7¾— 8
No. 1 composition	9¼— 9½
No. 1 composition turnings	9 — 9¼
Clean red car boxes	8½— 8¾
Cocks and faucets	8¼— 8½
Mixed heavy yellow brass	7 — 7¼
Old rolled brass	8¼— 8½
Brass pipe	8¾— 9
New soft brass clippings	12 —12½
Brass rod ends	9½— 9¾
No. 1 brass rod turnings	8½— 8¾
Aluminum	
Alum. pistons and struts	5 — 5½
Aluminum crankcases	6¾— 7
2S aluminum clippings	11½—12
Old sheet and utensils	6¾— 7
Borings and turnings	4 — 4½
Misc. cast aluminum	6¾— 7
Dural Clips (24S)	6¾— 7
Zinc	
New zinc clippings	8 — 8¼
Old zinc	5½— 6
Zinc routings	4¼— 4½
Old die cast scrap	4¼— 4½
Nickel and Monel	
Pure nickel clippings	20 —21
Clean nickel turnings	15 —16
Nickel anodes	20 —21
Nickel rod ends	19 —21
New Monel clippings	15½—16½
Clean Monel turnings	10 —11
Old sheet Monel	12 —13
Old Monel castings	10 —11
Inconel clippings	13 —14
Nickel silver clippings, mixed	7½— 8
Nickel silver turnings, mixed	6½— 7
Lead	
Soft scrap lead	8½— 9
Battery plates (dry)	4¼— 4½
Magnesium Alloys	
Segregated solids	8 — 9
Castings	4½— 5½
Miscellaneous	
Block tin	77 —79
No. 1 pewter	58 —60
No. 1 auto babbitt	42 —44
Mixed common babbitt	10½—11
Solder joints	14 —15
Siphon tops	45 —47
Small foundry type	12½—13
Monotype	11½—12
Lino. and stereotype	11 —11½
Electrotype	8½— 9
New type shell cuttings	12¾—13
Hand picked type shells	6 — 6½
Lino. and stereo. dross	6½— 7
Electro. dross	4½— 5

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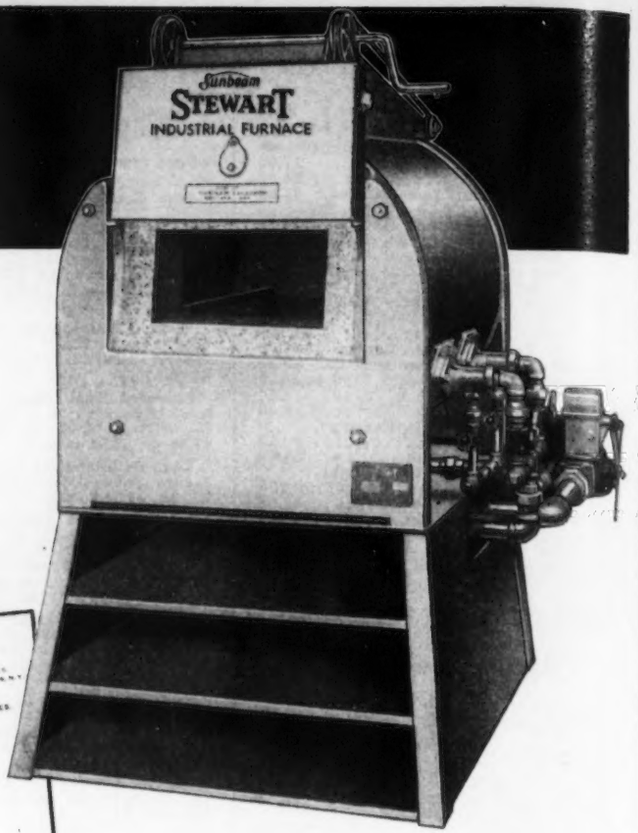

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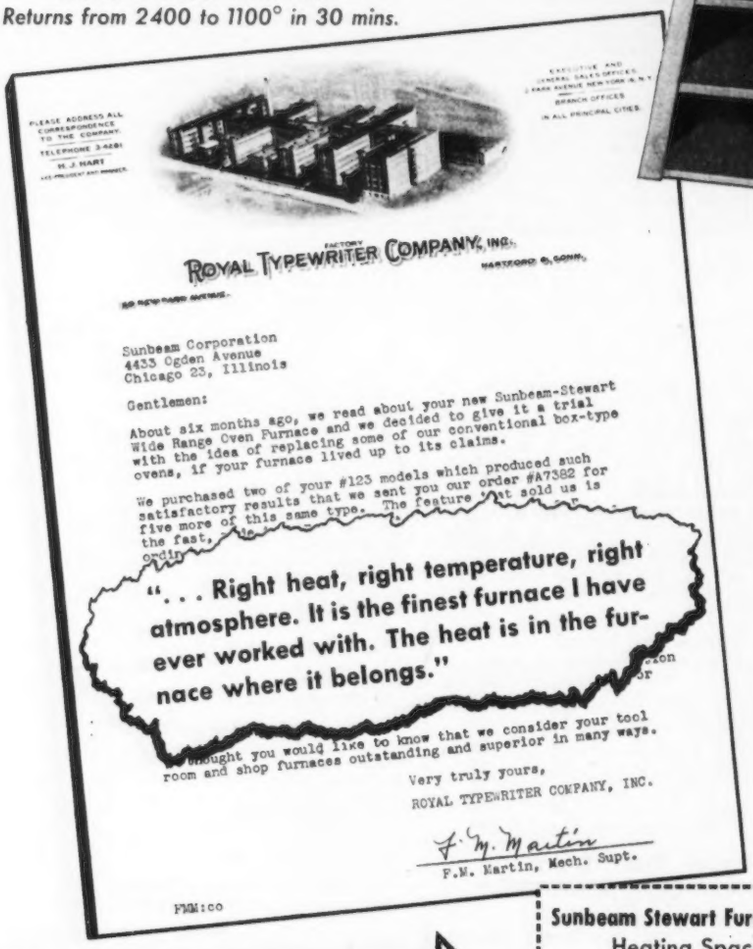

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Prices Slip Further But Tempo Slows

New York

• • • **This week the** scrap market continued its downward spiral with lower quotations for most items. There is still no large scale buying. What buying there is consists of small tonnage orders. Consumers are not interested in buying and many quotations are on a market appraisal basis.

THE IRON AGE scrap composite dropped another 83¢ per gross ton to $22.75 per gross ton. This represents a drop of $20.25 per gross ton since the first of the year. Prices for No. 1 heavy melting steel are: Pittsburgh, $24.50 to $25.00; Chicago, $21 to $22; and Philadelphia, $21.50 to $22.50.

Further price declines were evident in all areas, although No. 1 heavy melting at Pittsburgh remained unchanged from last week's quotation. Other declines were generally not as large as those of previous weeks. There were no indications of large scale consumer buying which would tend to strengthen the market. Some mills are expected to enter the market in the next few weeks but it will be anyone's guess as to how much is to be sought.

High priced inventories, declining order backlog, and lower sales volume are all important factors in today's scrap market. At today's quotations for some scrap items there are indications that scrap collection might dry up in some areas. The Scrap Drive Committee has been requested to terminate the iron and steel heavy scrap campaign as of May 15.

•

PITTSBURGH—Despite gloom in dealer and broker ranks there was nothing available at the beginning of this week to indicate any change in the No. 1 heavy melting steel price. No. 2 steel and No. 2 bundles were off $1 a ton on the basis of broker buying. In view of the difficulty of finding a market for production scrap, the market for No. 2 dealer scrap is shaky. Cast grades were as much as $3 a ton lower this week and shoveling turnings were off another $1. Good low phos. can now be delivered into this district from Detroit at a top price of $26.50 though in absence of demand little if any of this material is moving today. The overall market tone remains weak despite the resistance noted to lower prices this week and indications are that no big Pittsburgh consumer purchases will be made this month.

•

CHICAGO — Small sales and offers caused the market to slip a little lower last week. Most scrap men believe the bulk of inflationary prices have now been squeezed out of the market and that fluctuations from here on will be relatively small. Reports by some dealers that Carnegie-Illinois Steel had bought the latter part of the week of Apr. 10 were emphatically denied by Carnegie. They did buy a minor tonnage of blast furnace turnings but that is all. Railroad specialties continue to drift down and cast scrap still shows no strength. Due to strike possibilities in foundries supplying implement plants cast scrap inventories are being pared to the bone. This action has further weakened prices on the cast items.

•

PHILADELPHIA—Small tonnages of heavy melting grades were placed by two mills last week, No. 1 at $22.50, No. 2 at $20.00 and No. 2 bundles at $18.00. These prices represented declines of $1.50 to $2.50 within a week. There has been no business in turnings, but an appraisal of the market indicates reductions of $1.50 to $3.00. Cast grades are unchanged from last week, stabilized by mill and foundry buying to serve for the more expensive pig iron. Cast iron carwheels were sold at $30.00. There has been no business in other grades, but market prices have been reported lower on an appraisal basis. Resistance to selling at low prices has developed on the part of some dealers, who report that they are laying bundles on the ground in preference.

•

CLEVELAND—The market here and in the Valley was in a blue and apprehensive mood this week as prices of No. 2 steel, No. 2 bundles, turnings and most of the foundry grades continued to slump. Some orders are out for April and May, which, needless to say, are being covered at substantially lower prices as mills continue to accept only a part of their requirements in shipments, with the balance being supplied by inventory. This delaying action is expected to clean up the last of the overseas material, at least in some cases by May 1. Prices are still too high for dealers stockpiling and, anyway, the bears report that there will be no major buying of dealer grades for 60 days.

•

CINCINNATI — Progressive weakening of scrap prices continued here this week in the absence of any buying. Foundries and mills are out of the market and while material is moving on old orders, the tonnage is comparatively small. If steel making operations continue at present levels, the market here has reached a point where purchase of a large tonnage could start the spiral in an upward direction.

DETROIT—Scrap prices are still slipping in Detroit. However, the rate of decline has slowed down perceptibly so that some sources now believe stability may be reached here within the next week or 10 days. A sizable tonnage of low phos. sold here last week was the first substantial new order during the past several weeks, according to informed trade sources. A significant development noted here is the downgrading of material; No. 2 orders are being filled with No. 1 scrap and No. 1 orders are often being filled partially, at least, with low phos. material. This is a further indication of the inherent weakness of the present market.

•

NEW YORK—The weakness in the scrap market continues with lower quotations for most of the items. Some of the cast grades held their own on the downward trend. Business is virtually at a standstill with little consumer buying. Inventories are still heavy and until these are at lower levels there will be no appreciable amount of new business. No. 1 heavy melting is off another $2.50 per gross ton. In some grades there is no business and prices only represent an appraisal of the market.

•

ST. LOUIS—A further drop of $2 a ton in No. 2 heavy melting steel brought this item to within $2.50 of the OPA ceiling, and was the result of the purchase of 1500 tons by a district mill. As this mill uses approximately 25,000 tons monthly, it would indicate that the maneuver is to buy only to set a pattern, which has affected other items. The severest drop is in steel car axles which are off $10 a ton, as this item has lost the support of conversion deals, which have held it up.

•

BOSTON—Weakness has again cropped up. As a result what little business there was has dried up. Brokers say they cannot give scrap away, let alone sell it and almost all say they have no idea what prices are. Before current weakness developed, a few cars of No. 2 heavy melting steel and short turnings were shipped out of New England.

•

BIRMINGHAM—A pick up in trading has yet to occur in this market. About the only material moving is railroad scrap in limited tonnages. In the absence of any substantial purchases, prices quoted are on a market appraisal basis again.

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BUFFALO—New business was almost nonexistent at the start of the week and prices eased 50¢ to $5 a ton, the latter on railroad specialties. The minimum decline was effective on steelmaking grades, while shoveling turnings skidded $1 and machine shop turnings $2. Local mills were expected to stay out of the market for at least another week or 10 days and foundries, except for an occasional carload, were believed likely to hold off for considerably longer.

Going prices as obtained in the trade by THE IRON AGE, based on representative tonnages.

PITTSBURGH

Per gross ton delivered to consumer:

No. 1 hvy. melting	$24.50 to $25.00
RR. hvy. melting	25.50 to 26.00
No. 2 hvy. melting	*22.50 to 23.00
No. 2 bundles	20.50 to 21.00
RR. scrap rails	28.50 to 29.00
Rails 2 ft and under	34.50 to 35.00
No. 1 comp'd bundles	24.50 to 25.00
Hand bdld. new shts.	21.50 to 22.00
Hvy. steel forge turn.	23.50 to 24.00
Mach. shop turn.	17.00 to 18.00
Shoveling turn.	20.00 to 21.00
Mixed bor. and turn.	17.00 to 17.50
Cast iron borings	20.00 to 21.00
No. 1 mach. cast.	33.00 to 34.00
Mixed yard cast.	26.00 to 27.00
Hvy. breakable cast	26.00 to 26.50
Malleable	34.00 to 34.50
RR. knuck. and coup.	32.00 to 33.00
RR. coil springs	32.00 to 33.00
RR. leaf springs	32.00 to 33.00
Rolled steel wheels	32.00 to 33.00
Low phos.	26.00 to 26.50

*Apr. 7 quotation should have read 24.00 to 25.00.

CHICAGO

Per gross ton delivered to consumer:

No. 1 hvy. melting	$21.00 to $22.00
No. 2 hvy. melting	19.00 to 20.00
No. 1 bundles	21.00 to 22.00
No. 2 dealers' bundles	16.00 to 17.00
Mach. shop turn.	12.00 to 13.00
Short shov. turn.	13.00 to 14.00
Cast iron borings	12.00 to 13.00
Mix. borings and turn.	12.00 to 13.00
Low phos. hvy. forge	25.00 to 26.00
Low phos. plates	23.00 to 24.00
No. 1 RR. hvy. melt.	24.00 to 25.00
Rerolling rails	30.00 to 32.00
Miscellaneous rails	28.00 to 29.00
Angles & splice bars	34.00 to 35.00
Locomotive tires, cut	35.00 to 37.00
Cut bolster & side frames	34.00 to 36.00
Standard stl. car axles	32.00 to 35.00
No. 3 steel wheels	30.00 to 32.00
Couplers and knuckles	30.00 to 32.00
Rails, 2 ft and under	33.00 to 34.00
Malleable	23.00 to 26.00
No. 1 mach. cast.	29.00 to 30.00
No. 1 agricul. cast.	24.00 to 26.00
Heavy breakable cast.	25.00 to 26.00
RR. grate bars	21.00 to 23.00
Cast iron brake shoes	20.00 to 25.00
Cast iron car wheels	30.00 to 31.00

CINCINNATI

Per gross ton, f.o.b. cars:

No. 1 hvy. melting	$20.00 to $21.00
No. 2 hvy. melting	19.00 to 20.00
No. 1 bundles	19.00 to 20.00
No. 2 bundles	17.00 to 18.00
Mach. shop turn.	9.00 to 10.00
Shoveling turn.	9.00 to 10.00
Cast iron borings	10.00 to 11.00
Mixed bor. & turn.	10.00 to 11.00
Low phos. 18 in. under	24.00 to 25.00
No. 1 cupola cast.	28.00 to 29.00
Hvy. breakable cast.	23.00 to 24.00
Rails 18 in. and under	35.00 to 37.00
Rails random length	25.00 to 27.00
Drop broken	32.00 to 34.00

BOSTON

Brokers' buying prices per gross ton, on cars:

No. 1 hvy. melting	$14.50 to $15.00
No. 2 hvy. melting	13.50 to 14.00
No. 1 bundles	13.50 to 14.00
No. 2 bundles	12.50 to 13.00
Bushelings	13.50 to 14.00
Shoveling turn.	.... 11.00
Machine shop turn.	.... 8.25
Mixed bor. and turn.	7.00 to 8.00
Cl'n cast chem. bor.	22.00 to 25.00
No. 1 machinery cast.	25.00 to 28.00
No. 2 machinery cast.	24.00 to 26.00
Heavy breakable cast.	16.00 to 17.00
Stove plate	20.50 to 21.00

DETROIT

Per gross ton, brokers' buying prices f.o.b. cars:

No. 1 hvy. melting	$16.50 to $17.00
No. 2 hvy. melting	16.50 to 17.00
No. 1 bundles	16.50 to 17.00
New busheling	16.50 to 17.00
Flashings	16.50 to 17.00
Mach. shop turn.	11.50 to 12.00
Shoveling turn.	13.50 to 14.00
Cast iron borings	13.50 to 14.00
Mixed bor. & turn.	11.50 to 12.00
Low phos. plate	16.50 to 17.00
Heavy breakable cast.	13.00 to 17.00
Stove plate	16.00 to 17.00
Automotive cast.	23.00 to 25.00
No. 1 cupola cast.	19.00 to 23.00

PHILADELPHIA

Per gross ton delivered to consumer:

No. 1 hvy. melting	$21.50 to $22.50
No. 2 hvy. melting	19.00 to 20.00
No. 1 bundles	22.00 to 23.00
No. 2 bundles	17.00 to 18.00
Mach. shop turn.	15.00 to 16.00
Shoveling turn.	17.00 to 18.00
Mixed bor. and turn.	12.00 to 13.00
Clean cast chemical bor.	24.00 to 25.00
No. 1 machinery cast.	27.00 to 29.00
No. 1 mixed yard cast.	25.00 to 27.00
Hvy. breakable cast.	27.00 to 28.00
Hvy. axle forge turn.	21.50 to 22.50
Low phos. acid openhearth	25.00 to 26.00
Low phos. electric furnace	27.00 to 28.00
Low phos. bundles	23.00 to 24.00
RR. steel wheels	29.00 to 30.00
RR. coil springs	29.00 to 30.00
RR. malleable	24.00 to 28.00
Cast iron carwheels	29.00 to 30.00

ST. LOUIS

Per gross ton delivered to consumer:

No. 1 hvy. melting	$21.00 to $24.00
No. 2 hvy. melting	19.00 to 20.00
No. 2 bundled sheets	19.00 to 20.00
Mach. shop turn.	14.00 to 15.00
Shoveling turnings	14.00 to 15.00
Locomotive tires, uncut	24.00 to 25.00
Mis. std. sec. rails	23.00 to 24.00
Steel angle bars	26.00 to 27.00
Rails 3 ft and under	32.00 to 33.00
RR. steel springs	24.00 to 25.00
Steel car axles	28.00 to 30.00
Brake shoes	21.00 to 22.00
Malleable	24.00 to 25.00
Cast iron car wheels	30.00 to 31.00
No. 1 machinery cast	31.00 to 32.00
Hvy. breakable cast.	20.00 to 21.00
Stove plate	24.00 to 25.00

BIRMINGHAM

Per gross ton delivered to consumer:

No. 1 hvy. melting	$22.00
No. 2 hvy. melting	22.00
No. 2 bundles	20.00
No. 1 busheling	22.00
Long turnings	14.00
Shoveling turnings	15.00
Cast iron borings	18.00
Bar crops and plate	$25.00 to 26.00
Structural and plate	25.00 to 26.00
No. 1 cupola cast.	33.00 to 34.00
Stove plate	30.00 to 31.00
No. 1 RR. hvy. melt.	23.00 to 24.00
Steel axles	37.00 to 39.00
Scrap rails	25.00
Rerolling rails	30.00 to 32.00
Angles & splice bars	31.00 to 32.00
Rails 3 ft & under	31.00 to 32.00
Cast iron carwheels	30.00 to 31.00

YOUNGSTOWN

Per gross ton delivered to consumer:

No. 1 hvy. melting	$24.50 to $25.00
No. 2 hvy. melting	21.50 to 22.00
No. 1 bundles	24.50 to 25.00
No. 2 bundles	19.50 to 20.00
Mach. shop turn.	14.50 to 15.00
Short shov. turn.	19.50 to 20.00
Cast iron borings	19.50 to 20.00
Low phos.	24.50 to 25.00

NEW YORK

Brokers' buying prices per gross ton, on cars:

No. 1 hvy. melting	$15.00 to $16.00
No. 2 hvy. melting	13.00 to 14.00
No. 2 bundles	12.00 to 13.00
Mach. shop turn.	7.50 to 8.50
Mixed bor. & turn.	7.50 to 8.50
Shoveling turnings	10.00 to 11.00
Machinery cast.	22.00 to 23.00
Mixed yard cast.	20.00 to 21.00
Heavy breakable cast.	20.00 to 21.00
Charging box cast	20.00 to 21.00
Unstrp. motor blks.	16.00 to 17.00
Cl'n cast chem. bor.	23.00 to 24.00

BUFFALO

Per gross ton delivered to consumer:

No. 1 hvy. melting	$23.50 to $24.50
No. 2 hvy. melting	20.50 to 21.50
No. 1 bundles	20.50 to 21.50
No. 2 bundles	18.50 to 19.50
No. 1 busheling	20.50 to 21.50
Mach. shop turn.	14.00 to 15.00
Shoveling turn.	17.00 to 18.00
Cast iron borings	17.00 to 18.00
Mixed bor. and turn.	17.00 to 18.00
Cupola cast.	29.00 to 30.00
Mixed yard cast.	27.00 to 28.00
Stove plate	27.00 to 28.00
Small indus. malleable	22.00 to 23.00
Low phos. plate	25.50 to 26.50
Scrap rails	27.00 to 28.00
Rails 3 ft & under	32.00 to 33.00
RR. steel wheels	29.00 to 30.00
RR. coil & leaf spgs.	29.00 to 30.00
RR. knuckles & coup.	29.00 to 30.00

CLEVELAND

Per gross ton delivered to consumer:

No. 1 hvy. melting	$23.50 to $24.00
No. 2 hvy. melting	19.50 to 20.00
No. 1 bundles	23.50 to 24.00
No. 2 bundles	17.50 to 18.00
No. 1 busheling	23.50 to 24.00
Drop forge flashings	23.50 to 24.00
Mach. shop turn.	12.50 to 13.00
Shoveling turn.	18.50 to 19.00
Steel axle turn.	20.50 to 21.00
Cast iron borings	18.50 to 19.00
Mixed bor. & turn.	18.50 to 19.00
Low phos. 2 ft and under	24.50 to 25.00
No. 1 mach. cast.	29.00 to 30.00
Malleable	26.00 to 27.00
RR. cast.	31.00 to 32.00
Railroad grate bars	21.00 to 22.00
Stove plate	21.00 to 22.00
RR. hvy. melting	29.00 to 30.00
Rails 3 ft and under	35.00 to 36.00
Rails 18 in. and under	36.00 to 37.00

SAN FRANCISCO

Per gross ton delivered to consumer:

No. 1 hvy. melting	$22.00
No. 2 hvy. melting	20.00
No. 1 bales	18.00
No. 2 bales	18.00
No. 3 bales	15.00
Mach. shop turn.	12.00
Elec. fur. 1 ft under	30.00
No. 1 cupola cast.	$30.00 to 35.00
RR. hvy. melting	22.00
Rails	25.00

LOS ANGELES

Per gross ton delivered to consumer:

No. 1 hvy. melting	$22.00
No. 2 hvy. melting	20.00
No. 1 bales	18.00
No. 2 bales	18.00
No. 3 bales	15.00
Mach. shop turn.	12.00
Elec. fur. 1 ft under	30.00
No. 1 cupola cast.	$30.00 to 35.00
RR. hvy. melting	22.00

SEATTLE

Per gross ton delivered to consumer:

No. 1 & No. 2 hvy. melt.	$22.00
No. 1 & No. 2 bales	18.00
No. 3 bales	15.00
Elec. fur. 1 ft and under	30.00
No. 1 cupola cast.	$30.00 to 32.00
RR. hvy. melting	22.00

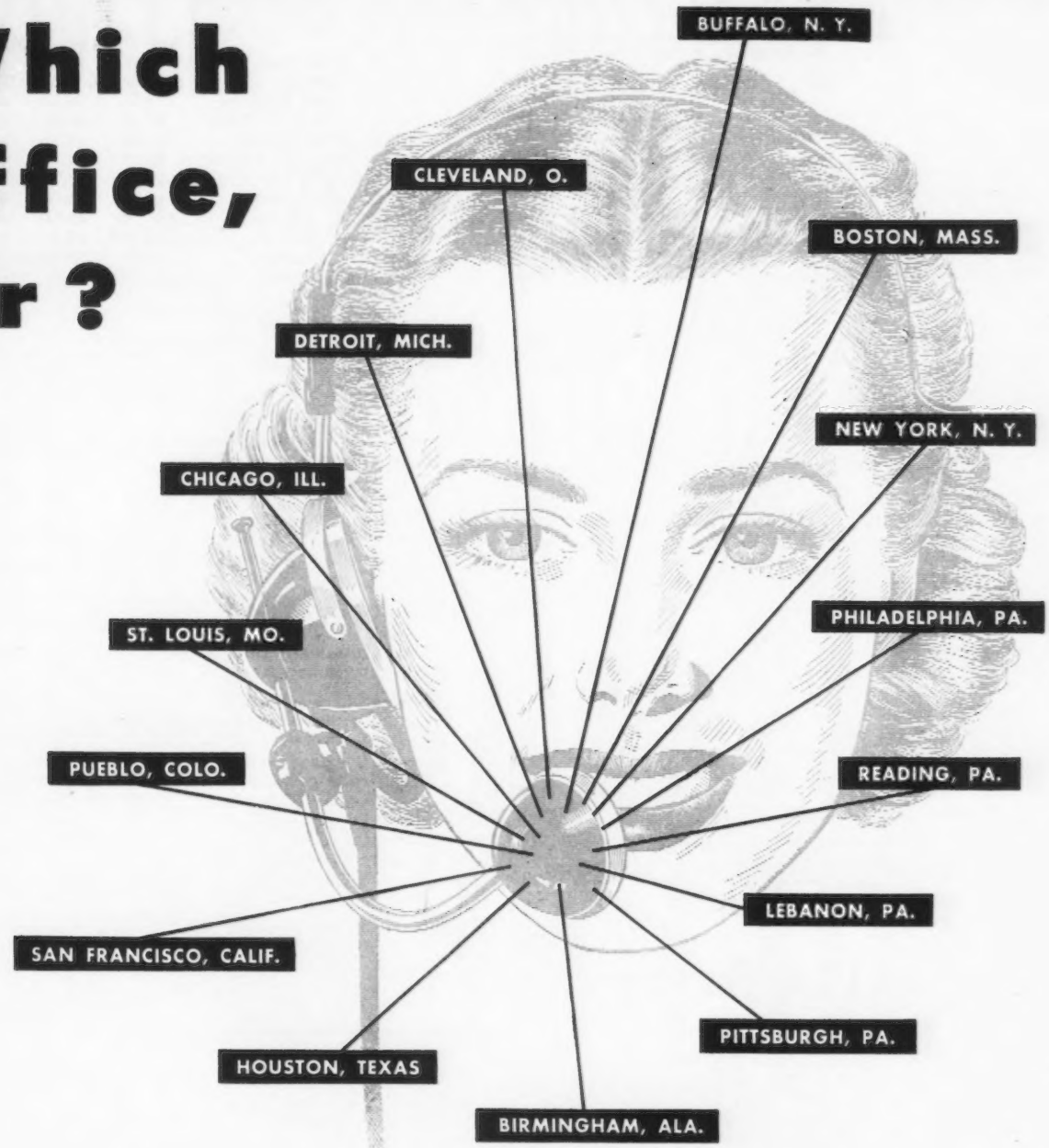
HAMILTON, ONT.

Per gross ton delivered to consumer:
Cast grades f.o.b. shipping point:

Heavy melting	$23.00*
No. 1 bundles	23.00*
No. 2 bundles	22.50*
Mechnical bundles	21.00*
Mixed steel scrap	19.00*
Mixed borings and turnings	17.00*
Rails, remelting	23.00*
Rails, rerolling	26.00*
Bushelings	17.50*
Bushelings, new fact, prop'd	21.00*
Bushelings, new fact, unprop'd	16.00*
Short steel turnings	17.00*
No. 1 cast.	$48.00 to 50.00*
No. 2 cast.	44.00 to 45.00*

*Ceiling Price.

Which office, sir?



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LEADERS IN IRON AND STEEL SCRAP SINCE 1889

Comparison of Prices . .

Price advances over previous week are printed in Heavy Type; declines appear in *Italics*.

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Flat-Rolled Steel: (cents per pound)	Apr. 19, 1949	Apr. 12, 1949	Mar. 22, 1949	Apr. 20, 1948
Hot-rolled sheets	3.25	3.25	3.26	2.80
Cold-rolled sheets	4.00	4.00	4.00	3.55
Galvanized sheets (10 ga)	4.40	4.40	4.40	3.95
Hot-rolled strip	3.25	3.25	3.265	2.80
Cold-rolled strip	4.038	4.038	4.063	3.55
Plates	3.42	3.42	3.42	2.95
Plates wrought iron	7.85	7.85	7.85	7.25
Stains C-R strip (No. 302)	33.25	33.25	33.25	30.50
Tin and Terneplate: (dollars per base box)				
Tinplate (1.50 lb) cokes	$7.75	$7.75	$7.75	$6.80
Tinplate, electro (0.50 lb)	6.70	6.70	6.70	6.00
Special coated mfg. ternes	6.65	6.65	6.65	5.90
Bars and Shapes: (cents per pound)				
Merchant bars	3.35	3.35	3.37	2.90
Cold-finished bars	3.995	3.995	3.995	3.55
Alloy bars	3.75	3.75	3.75	3.30
Structural shapes	3.25	3.25	3.25	2.80
Stainless bars (No. 302)	28.50	28.50	28.50	26.00
Wrought iron bars	9.50	9.50	9.50	8.65
Wire: (cents per pound)				
Bright wire	4.15	4.15	4.15	3.55
Rails: (dollars per 100 lb)				
Heavy rails	$3.20	$3.20	$3.20	$2.75
Light rails	3.55	3.55	3.55	3.10
Semifinished Steel: (dollars per net ton)				
Rerolling billets	$52.00	$52.00	$52.00	$45.00
Slabs, rerolling	52.00	52.00	52.00	45.00
Forging billets	61.00	61.00	61.00	54.00
Alloy blooms, billets, slabs	63.00	63.00	63.00	66.00
Wire rod and Skelp: (cents per pound)				
Wire rods	3.40	3.40	3.463	2.80
Skelp	3.25	3.25	3.25	2.90

Pig Iron: (per gross ton)	Apr. 19, 1949	Apr. 12, 1949	Mar. 22, 1949	Apr. 20, 1948
No. 2, foundry, Phila.	$50.65	$50.56	$51.56	$44.61
No. 2, Valley furnace	46.50	46.50	46.50	39.50
No. 2, Southern Cin'ti*	49.47	49.47	49.47	43.28
No. 2, Birmingham	43.38	43.38	43.38	37.38
No. 2, foundry, Chicago†	46.50	46.50	46.50	39.00
Basic del'd Philadelphia*	49.81	49.76	50.76	44.11
Basic, Valley furnace	46.00	46.00	46.00	39.00
Malleable, Chicago†	46.50	46.50	46.50	39.50
Malleable, Valley	46.50	46.50	46.50	39.50
Charcoal, Chicago	73.78	73.78	73.78	62.46
Ferromanganese‡	161.40	161.40	161.40	145.00

† The switching charge for delivery to foundries in the Chicago district is $1 per ton.
‡ Average of U. S. prices quoted on Ferroalloy page.
* Does not include interim increase on total freight charges, effective Jan. 11, 1949.

Scrap (per gross ton)				
Heavy melt'g steel, P'gh.	$24.75	$24.75	$36.75	$40.25
Heavy melt'g steel, Phila.	*22.00*	23.50	34.50	41.50
Heavy melt'g steel, Ch'go	*21.50*	22.50	33.50	39.25
No. 1, hy. comp. sh't, Det.	*16.75*	17.50	31.00	35.50
Low phos. Young'n	*24.75*	27.50	39.00	45.25
No. 1, cast, Pittsburgh	*33.50*	36.50	41.50	64.00
No. 1, cast, Philadelphia	28.00	28.00	38.50	65.50
No. 1, cast, Chicago	*29.50*	31.00	41.50	74.00
Coke, Connellsville: (per net ton at oven)				
Furnace coke, prompt	$14.50	$14.50	$14.50	$12.50
Foundry coke, prompt	16.50	16.50	16.50	14.00
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electro, Conn.	*21.50*	23.375	23.50	21.50
Copper, Lake Conn.	23.625	23.625	23.625	21.625
Tin, Grade A, New York	$1.03	$1.03	$1.03	94.00
Zinc, East St. Louis	*13.00*	15.00	17.50	12.00
Lead, St. Louis	14.80	14.80	17.80	17.30
Aluminum, virgin	17.00	17.00	17.00	15.00
Nickel, electrolytic	42.93	42.93	42.93	36.56
Magnesium, ingot	20.50	20.50	20.50	20.50
Antimony, Laredo, Tex.	38.50	38.50	38.50	33.00

Composite Prices . .

Starting with the issue of Apr. 22, 1943, the weighted finished steel index was revised for the years 1941, 1942, and 1943. See explanation of the change on p. 90 of the Apr. 22, 1943, issue. Index revised to a quarterly basis as of Nov. 16, 1944; for details see p. 98 of that issue. The finished steel composite price for the current quarter is an estimate based on finished steel shipments for the previous quarter. This figure will be revised when shipments for this quarter are compiled.

	FINISHED STEEL (Base Price)	PIG IRON	SCRAP STEEL
Apr. 19, 1949	3.74887¢ per lb.	*$46.59* per gross ton	*$22.75* per gross ton
One week ago	3.74887¢ per lb.	$46.66 per gross ton	$23.58 per gross ton
One month ago	3.75454¢ per lb.	$46.82* per gross ton	$34.92 per gross ton
One year ago	3.28244¢ per lb.	$40.11 per gross ton	$40.33 per gross ton

*Revised.

	HIGH	LOW
1949	3.76049¢ Jan. 1	3.74887¢ Apr. 12
1948	3.75700¢ July 27	3.22566¢ Jan. 1
1947	3.19541¢ Oct. 7	2.87118¢ Jan. 7
1946	2.83599¢ Dec. 31	2.54490¢ Jan. 1
1945	2.44104¢ Oct. 2	2.54490¢ Jan. 2
1944	2.30837¢ Sept. 5	2.21189¢ Oct. 5
1943	2.29176¢	2.29176¢
1942	2.28249¢	2.28249¢
1941	2.43078¢	2.43078¢
1940	2.30467¢ Jan. 2	2.24107¢ Apr. 16
1939	2.35367¢ Jan. 3	2.26689¢ May 16
1938	2.58414¢ Jan. 4	2.27207¢ Oct. 18
1937	2.58414¢ Mar. 9	2.32263¢ Jan. 4
1936	2.32263¢ Dec. 28	2.05200¢ Mar. 10
1935	2.07642¢ Oct. 1	2.06492¢ Jan. 8
1934	2.15367¢ Apr. 24	1.95757¢ Jan. 2
1933	1.95578¢ Oct. 3	1.75836¢ May 2
1932	1.89196¢ July 5	1.83901¢ Mar. 1
1931	1.99626¢ Jan. 13	1.86586¢ Dec. 29
1929	2.31773¢ May 28	2.26498¢ Oct. 29

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold-rolled sheets and strip, representing major portion of finished steel shipments. Index recapitulated in Aug. 28, 1941, issue.

HIGH	LOW
$46.82 Jan. 4	$46.59 Apr. 19
46.91 Oct. 12	39.58 Jan. 6
37.98 Dec. 30	30.14 Jan. 7
30.14 Dec. 10	25.37 Jan. 1
25.37 Oct. 23	23.61 Jan. 2
$23.61	$23.61
23.61	23.61
23.61	23.61
$23.61 Mar. 20	$23.45 Jan. 2
23.45 Dec. 23	22.61 Jan. 2
22.61 Sept. 19	20.61 Sept. 12
23.25 June 21	19.61 July 6
23.25 Mar. 9	20.25 Feb. 16
19.74 Nov. 24	18.73 Aug. 11
18.84 Nov. 5	17.83 May 14
17.90 May 1	16.90 Jan. 27
16.90 Dec. 5	13.56 Jan. 3
14.81 Jan. 5	13.56 Dec. 6
15.90 Jan. 6	14.79 Dec. 15
18.71 May 14	18.21 Dec. 17

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

HIGH	LOW
$43.00 Jan. 1	$22.75 Apr. 19
43.16 July 27	39.75 Mar. 9
42.58 Oct. 28	29.50 May 20
31.17 Dec. 24	19.17 Jan. 1
19.17 Jan. 2	18.92 May 22
19.17 Jan. 11	15.76 Oct. 24
$19.17	$19.17
19.17	19.17
$22.00 Jan. 7	$19.17 Apr. 10
21.83 Dec. 30	16.04 Apr. 9
22.50 Oct. 3	14.08 May 16
15.00 Nov. 22	11.00 June 7
21.92 Mar. 30	12.67 June 9
17.75 Dec. 21	12.67 June 8
13.42 Dec. 10	10.33 Apr. 29
13.00 Mar. 13	9.50 Sept. 25
12.25 Aug. 8	6.75 Jan. 3
8.50 Jan. 12	6.43 July 5
11.33 Jan. 6	8.50 Dec. 29
17.58 Jan. 29	14.08 Dec. 8

Based on No. 1 heavy melting steel scrap quotations to consumers at Pittsburgh, Philadelphia and Chicago.

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Iron and Steel Prices . . .

Steel prices shown here are f.o.b. producing points in cents per pound unless otherwise indicated. Extras apply. (1) Commercial quality sheet grade; prices, 0.25¢ above base. (2) Commercial quality grade. (3) Widths up to 12-in. inclusive. (4) 0.25 carbon and less. (5) Cokes, 1.25 lb, deduct 25¢ per base box. (6) 18 gage and heavier. (7) For straight length material only from producers to fabricators. (8) Also shafting. For quantities of 40,000 lb and over. (9) Carload lot in manufacturing trade. (10) Hollowware enameling, gages 29 to 31 only. (11) Produced to dimensional tolerances in AISI Manual Sec. 6. (12) Slab prices subject to negotiation in most cases. (13) San Francisco only. (14) Los Angeles only. (15) San Francisco and Los Angeles only. (16) Seattle only. (17) Seattle and Los Angeles only.

PRODUCTS	Base prices at producing points apply to the sizes and grades produced in these areas														
	Pittsburgh	Chicago	Gary	Cleveland	Birmingham	Buffalo	Youngstown	Sparrows Point	Granite City	Middletown, Ohio		Detroit	Johnstown	Seattle, S. Frisco, LosAngeles	Fontana
INGOTS Carbon forging	$50.00														
Alloy	$51.00						(per net ton)								
BILLETS, BLOOMS, SLABS Carbon, rerolling[12]	$52.00				$52.00	$52.00	(per net ton)						$52.00		
Carbon forging billets	$61.00	$61.00	$61.00	$61.00	$61.00	$61.00	(per net ton)						$61.00		
Alloy	$63.00	$63.00				$63.00	(Bethlehem, Canton, Massillon = $63.00) (per net ton)								
PIPE SKELP	3.25						3.25				Warren = 3.25				
WIRE RODS	3.40	3.40		3.40	3.40		3.40	3.50			Worcester 3.70		3.40	4.05[13] 4.20[14]	
SHEETS Hot-rolled[6]	3.25	3.25	3.25	3.25	3.25	3.25 (Conshohocken,	3.25 Pa. 3.75)	3.25		Warren, Ashland = 3.25		3.45		3.95[15]	4.15
Cold-rolled[1]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.20	4.00	Warren 4.00	4.20		Pittsburg, Cal. 4.95	
Galvanized (10 gage)	4.40	4.40	4.40		4.40			4.40	Canton =4.40	4.40	Ashland =4.40			5.15[18]	
Enameling (12 gage)	4.40	4.40	4.40	4.40			4.40		4.60	4.40		4.70			
Long ternes[2] (10 gage)	4.80		4.80							4.80					
STRIP Hot-rolled[3]	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25		3.25	Warren = 3.25	3.45		4.00 to 4.25	4.65
Cold-rolled[4]	4.00	4.15		4.00		4.00	4.00	4.00		New Haven 4.50 Warren = 4.00 to 4.25		4.20 to 4.50			5.55
TINPLATE Cokes, 1.50 lb.[5] base box	$7.75	$7.75	$7.75		$7.85			$7.85	$7.95	Warren, Ohio =$7.75				Pittsburg, Cal. =$8.50	
Electrolytic 0.25, 0.50, 0.75 lb. box	Deduct $1.30, $1.05 and 75¢ respectively from 1.50 lb. coke base box price														
TERNES MFG., special coated	Deduct $1.10 from 1.50 lb. coke base box price														
BLACKPLATE CANMAKING 55 to 128 lb.	Deduct $2.00 from 1.50 lb. coke base box price														
BLACKPLATE, h.e., 29 ga.[10]	5.30	5.30	5.30					5.40		Warren, Ohio =5.30					
BARS Carbon Steel	3.35	3.35	3.35	3.35	3.35	3.35	3.35	3.35		3.35	Canton =3.35	3.55	3.35	4.05 to 4.10	4.00
Reinforcing (billet)[7]	3.35	3.35	3.35	3.35	3.35	3.35	3.35	3.35			Canton =3.35		3.35	4.05 to 4.10	4.00
Cold-finished[8]	3.95 to 4.00	4.00	4.00	4.00		4.00	4.00					4.30			
Alloy, hot-rolled	3.75	3.75	3.75			3.75	3.75	Bethlehem, Canton, Massillon =3.75				4.05	3.75	4.80[14]	4.75
Alloy cold-drawn	4.65	4.65	4.65	4.65		4.65	4.65	Massillon =4.65			Worcester 4.95				
PLATE Carbon steel[11]	3.40 to 3.60	3.40	3.40	3.40 to 3.60	3.40 Cons	3.45 hohocken	3.40 =3.55	3.45 Coatesville =3.50, Claymont =3.65 Geneva =3.40, Harrisburg =4.95				3.65	3.45	4.30[16]	5.30
Floor plates	4.55	4.55		4.55				Conshohocken =4.55							
Alloy	4.40	4.40							Coatesville =5.10						
SHAPES, Structural	3.25	3.25	3.25		3.25	3.30	Bethlehem =3.30, Geneva, Utah =3.25						3.30	3.85 to 4.30	3.80
MANUFACTURERS' WIRE[9] Bright	4.15	4.15		4.15	4.15		4.15	4.25	Duluth =4.15, Worcester =4.45				4.15	5.15[13]	
Spring (high carbon)	5.20	5.20		5.20				5.30	Worcester =5.50 New Haven, Trenton =5.50				5.20	Duluth = 5.20-6.15	
PILING, Steel sheet	4.05	4.05				4.05									

STAINLESS STEELS

Base prices, in cents per pound, f.o.b. producing point

Product	Chromium Nickel						Straight Chromium		
	301	302	303	304	316	347	410	416	430
Ingots, rerolling	12.75	13.50	15.00	15.50	22.75	20.00	11.25	13.75	11.50
Slabs, billets, rerolling	17.00	18.25	20.25	19.25	30.25	26.75	15.00	18.50	15.25
Forging discs, die blocks, rings	30.50	30.50	33.00	32.00	49.00	41.00	24.50	25.00	25.00
Billets, forging	24.25-26.50	24.25-26.50	26.25-28.75	25.50-27.75	39.00-42.75	32.75-35.75	19.50-21.50	20.00-21.75	20.00-21.75
Bars, wire, structurals	28.50	28.50	31.00	30.00	46.00	38.50	23.00	23.50	23.50
Plates	32.00	32.00	34.00	34.00	50.50	44.00	26.00	26.50	26 50
Sheets	37.50-40.75	37.50-40.75	39.50-43.00	39.50-43.00	53.00-57.25	50.00-54.00	33.00	33.50	35.50
Strip, hot-rolled	24.25	25.75	30.00	27.75	46.00	38.75	21.25	28.00	21.75
Strip, cold-rolled	30.50-30.75	33.00-33.50	36.50-39.50	35.00-35.75	55.00-57.25	48.50-50.00	27.00	33.50	27.50

ELECTRODES

Cents per lb. f.o.b. plant, threaded electrodes with nipples, unboxed

Diameter in in.	Length in in.	
Graphite		
17, 18, 20	60, 72	16.00¢
8 to 16	48, 60, 72	16.50¢
7	48, 60	17.75¢
6	48, 60	19.00¢
4, 5	40	19.50¢
3	40	20.50¢
2½	24, 30	21.00¢
2	24, 30	23.00¢
Carbon		
40	100, 110	7.50¢
35	65, 110	7.50¢
30	65, 84, 110	7.50¢
24	72 to 104	7.50¢
17 to 20	84, 90	7.50¢
14	60, 72	8.00¢
10, 12	60	8.25¢
8	60	8.50¢

TOOL STEEL

F.o.b. mill

W	Cr	V	Mo	Co	Base per lb
18	4	1	—	—	90.5¢
18	4	1	—	5	$1.42
18	4	2	—	—	$1.025
1.5	4	1.5	8	—	65¢
6	4	2	6	—	69.5¢

High-carbon-chromium ..... 52¢
Oil hardened manganese ..... 29¢
Special carbon ..... 26.5¢
Extra carbon ..... 22¢
Regular carbon ..... 19¢

Warehouse prices on and east of Mississippi are 2½¢ per lb higher. West of Mississippi, 4½¢ higher.

ELECTRICAL SHEETS

24 gage, HR cut lengths, f.o.b. mill

	Cents per lb
Armature	5.45
Electrical	5.95
Motor	6.70
Dynamo	7.50
Transformer 72	8.05
Transformer 65	8.60 to 10.60
Transformer 58	9.30 to 11.30
Transformer 52	10.10

RAILS, TRACK SUPPLIES

F.o.b. mill

Standard rails, 100 lb and heavier, No. 1 quality, per 100 lb..... $3.20†
Joint bars, 100 lb 4.25
Light rails (from billets) per 100 lb 3.55

	Base Price cents per lb
Track spikes	5.35
Axles	5.20
Screw spikes	8.00
Tie plates	4.05
Tie plates, Pittsburgh, Calif.*	4.20
Track bolts, untreated	8.25
Track bolts, heat treated, to railroads	8.50

*Seattle, add 30¢.
†CF&I, $3.30.

C-R SPRING STEEL

Base per pound f.o.b. mill

0.26 to 0.40 carbon	4.00¢
0.41 to 0.60 carbon	5.50¢
0.61 to 0.80 carbon	6.10¢
0.81 to 1.05 carbon	8.05¢
1.06 to 1.35 carbon	10.35¢

Worcester, add 0.30¢.

CLAD STEEL

Base prices, cents per pound

	Plate	Sheet
Stainless clad		
No. 304, 20 pct, f.o.b.		
Coatesville, Pa.	*26.50	
Washington, Pa.	*26.50	*22.50
Claymont, Del.	*26.50	
Conshohocken, Pa.		*22.50
Nickel-clad		
10 pct f.o.b. Coatesville, Pa.	27.50	
Inconel-clad		
10 pct, f.o.b. Coatesville.	36.00	
Monel-clad		
10 pct, f.o.b. Coatesville.	29.00	
Aluminized steel sheets		
Hot dip, 20 gage, f.o.b. Butler, Pa.		9.25

* Includes annealing and pickling, or sandblasting.

MERCHANT WIRE PRODUCTS

To the dealer, f.o.b. mill

	Base Column	Pittsburg, Calif.
Standard & coated nails*	103	123
Galvanized nails*	103	123
Woven wire fence†	109	132
Fence posts, carloads††	114	...
Single loop bale ties	106	130
Galvanized barbed wire**	123	143
Twisted barbless wire	123	...

* Pgh., Chi., Duluth; Worcester, 6 columns higher. † 15½ gage and heavier. ** On 80 rod spools, in carloads. †† Duluth only.

	Base per 100 lb	Pittsburg, Calif.
Annealed fence wire‡	$4.80	$5.75
Annealed, galv. fencing‡	5.25	6.20
Cut nails, carloads‡‡	6.75	...

‡ Add 30¢ at Worcester; 10¢ at Sparrows Pt.
‡‡ Less 20¢ to jobbers.

HIGH STRENGTH, LOW ALLOY STEELS

Mill base prices, cents per pound

Steel	Aldecor	Corten	Double Strength No. 1	Dynalloy	HI Steel	Mayari R	Otiscoloy	Yoloy	NAX High Tensile
Producer	Republic	Carnegie-Illinois, Republic	Republic	Alan Wood	Inland	Bethlehem	Jones & Laughlin	Youngstown Sheet & Tube	Great Lakes Steel
Plates	5.20	5.20	5.20	5.30	5.20	5.30	5.20	5.20	5.65
Sheets									
Hot-rolled	4.95	4.95	4.95	4.95	4.95	4.95	4.95	4.95	5.25
Cold-rolled	6.05	6.05	6.05	.....	6.05	6.05	6.05	6.05	6.35
Galvanized	.....	6.75	.....	.....	.....	6.75	.....	.....	.....
Strip									
Hot-rolled	4.95	4.95	4.95	....	4.95	4.95	4.95	4.95	5.25
Cold-rolled	.....	.....	6.05	.....	.....	6.05	6.05	6.05	6.35
Shapes	.....	4.95	.....	.....	4.95	5.05	4.95	4.95	.....
Beams	.....	4.95	.....	.....	.....	.....	.....	.....	.....
Bars									
Hot-rolled	5.10	5.10	5.10	.....	5.10	5.10	5.10	5.10	5.40
Bar shapes	.....	5.10	.....	.....	5.10	5.10	5.10	5.10	.....

PIPE AND TUBING

Base discounts, f.o.b. mills, Base price, $200.00 per net ton.

STANDARD, THREADED AND COUPLED

Steel, buttweld	Black	Galv.
½-in.	43 to 41	23½ to 21½
¾-in.	46 to 44	27½ to 25½
1-in.	48½ to 46½	30½ to 28½
1¼-in.	49 to 47	31 to 29
1½-in.	49½ to 47½	31½ to 29½
2-in.	50 to 48	32 to 30
2½ to 3-in.	50½ to 48½	32½ to 30½
Steel, lapweld		
2-in.	39½	23 to 21
2½ to 3-in.	43½ to 42½	25 to 24
3½ to 6-in.	46½ to 42½	28 to 24
Steel, seamless		
2-in.	38½ to 27	20 to 8½
2½ to 3-in.	41½ to 32½	23 to 14
3½ to 6-in.	43½ to 38½	25 to 20
Wrought Iron, buttweld		
½-in.	+20½	+49
¾-in.	+10½	+38
1 & 1¼-in.	+ 4½	+29
2-in.	— 1½	+25½
3-in.	— 2	+25
Wrought Iron, lapweld		
2-in.	+ 7½	+33
2½ to 3½-in.	+ 5	+28½
4-in.	list	+22½
4½ to 8-in.	+ 2	+24

EXTRA STRONG, PLAIN ENDS

Steel, buttweld		
½-in.	42 to 40	24 to 22
¾-in.	46 to 44	28 to 26
1-in.	48 to 46	31 to 29
1¼-in.	48½ to 46½	31½ to 29½
1½-in.	49 to 47	32 to 30
2-in.	49½ to 47½	32½ to 31½
2½ to 3-in.	50 to 48	33 to 31
Steel, lapweld		
2-in.	39½ to 38½	22 to 21
2½ to 3-in.	44½ to 42½	27 to 25
3½ to 6-in.	48 to 44	30½ to 28½
Steel, seamless		
2-in.	37½ to 32½	20 to 15
2½ to 3-in.	41½ to 36½	24 to 20
3½ to 6-in.	45	27½
Wrought Iron, buttweld		
½-in.	+16	+43
¾-in.	+ 9½	+36
1 to 2-in.	— 1½	+25
Wrought Iron, lapweld		
2-in.	+ 4½	+29½
2½ to 4-in.	— 5	+18
4½ to 6-in.	— 1	+22½

For threads only, buttweld, lapweld and seamless pipe, one point higher discount (lower price) applies. For plain ends, buttweld, lapweld and seamless pipe 3-in. and smaller, three points higher discount (lower price) applies, while for lapweld and seamless 3½-in. and larger four points higher discount (lower price) applies. On buttweld and lapweld steel pipe, jobbers are granted a discount of 5 pct. On l.c.l. shipments, prices are determined by adding 25 pct and 30 pct and the carload freight rate to the base card.

BOILER TUBES

Seamless steel and electric welded commercial boiler tubes and locomotive tubes, minimum wall. Prices per 100 ft at mill in carload lots, cut length 4 to 24 ft inclusive.

OD Gage		Seamless		Electric Weld	
in.	BWG	H.R.	C.R.	H.R.	C.D.
2	13	19.18	22.56	18.60	21.89
2½	12	25.79	30.33	25.02	29.41
3	12	28.68	33.76	27.82	32.74
3½	11	35.85	42.20	34.78	40.94
4	10	44.51	52.35	43.17	50.78

CAST IRON WATER PIPE

Per net ton

6 to 24-in., del'd Chicago $106.70
6 to 24-in., del'd N. Y. ..... 103.50 to 108.40
6 to 24-in., Birmingham 93.50
6-in. and larger, f.o.b. cars, San Francisco, Los Angeles, for all rail shipment; rail and water shipment less 120.30

Class "A" and gas pipe, $5 extra; 4-in. pipe is $5 a ton above 6-in.

BOLTS, NUTS, RIVETS, SET SCREWS

Consumer Prices

(Bolts and nuts f.o.b. mill Pittsburgh, Cleveland, Birmingham or Chicago)

Base discount less case lots

Machine and Carriage Bolts

	Pct Off List
½ in. & smaller x 6 in. & shorter	35
9/16 & ⅝ in. x 6 in. & shorter	37
¾ in. & larger x 6 in. & shorter	34
All diam, longer than 6 in.	30
Lag, all diam over 6 in. longer	35
Lag, all diam x 6 in. & shorter	37
Plow bolts	47

Nuts, Cold Punched or Hot Pressed

(Hexagon or Square)

½ in. and smaller	35
9/16 to 1 in. inclusive	34
1⅛ to 1½ in. inclusive	32
1⅝ in. and larger	27

On above bolts and nuts, excepting plow bolts, additional allowance of 15 pct for full container quantities. There is an additional 5 pct allowance for carload shipments.

Semifinished Hexagon Nuts

	USS	SAE
7/16 in. and smaller	..	41
½ in. and smaller	38	..
½ in. through 1 in.	..	39
9/16 in. through 1 in.	37	..
⅝ in. through 1½ in.	35	37
1⅝ in. and larger	28	..

In full case lots, 15 pct additional discount.

Stove Bolts

Packages, nuts separate	$61.75
In bulk	70.00

Large Rivets

(½ in. and larger)
Base per 100 lb

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	$6.75
F.o.b. Lebanon, Pa.	6.75

Small Rivets

(7/16 in. and smaller)
Pct off List

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	48

Cap and Set Screws

(In packages) — *Pct Off List*

Hexagon head cap screws, coarse or fine thread, up to and incl. 1 in. x 6 in., SAE 1020, bright	46
¾ to 1 in. x 6 in., SAE (1035), heat treated	35
Milled studs	19
Flat head cap screws, listed sizes	5
Fillister head cap, listed sizes	28

FLUORSPAR

Washed gravel fluorspar, f.o.b. cars, Rosiclare, Ill.

Effective CaF, Content:	Base price per net ton
70% or more	$37.00
60% or less	34.00

LAKE SUPERIOR ORES

(51.50% Fe, Natural Content, Delivered Lower Lake Ports)

	Per Gross Ton
Old range, bessemer	$7.60
Old range, nonbessemer	7.45
Mesabi, bessemer	7.35
Mesabi, nonbessemer	7.20
High phosphorus	7.20

After Dec. 31, 1948, increases or decreases in Upper Lake freight, dock and handling charges and taxes thereon to be for the buyers' account.

METAL POWDERS

Per pound, f.o.b. shipping point, in ton lots, for minus 100 mesh.

Swedish sponge iron c.i.f. New York, ocean bags	7.9¢ to 9.0¢
Domestic sponge iron, 98+% Fe, carload lots	9.0¢ to 15.0¢
Electrolytic iron, annealed, 99.5+% Fe	31.5¢ to 39.5¢
Electrolytic iron, unannealed, minus 325 mesh, 99+% Fe	48.5¢
Hydrogen reduced iron, minus 300 mesh, 98+% Fe.	63.0¢ to 80.0¢
Carbonyl iron, size 5 to 10 microns, 98%, 99.8%+ Fe	90.0¢ to $1.78
Aluminum	31.00¢
Antimony	51.17¢
Brass, 10 ton lots	27.25 to 37.25¢
Copper, electrolytic	33.625¢
Copper, reduced	34.25¢
Cadmium	$2.40
Chromium, electrolytic, 99% min.	$3.50
Lead	23.00¢
Manganese	60.00¢
Molybdenum, 99%	$2.65
Nickel, unannealed	67.00¢
Nickel, spherical, minus 30 mesh, unannealed	68.00¢
Silicon	34.00¢
Solder powder	8.5¢ plus metal cost
Stainless steel, 302	75.0¢
Tin	$1.155
Tungsten, 99%	$3.90
Zinc, 10 ton lots	16.00 to 19.75¢

COKE

	Net Ton
Furnace, beehive (f.o.b. oven) Connellsville, Pa.	$14.00 to $15.00
Foundry, beehive (f.o.b. oven) Connellsville, Pa.	$16.00 to $17.00
Foundry, Byproduct	
Buffalo, del'd	$22.95
Chicago, f.o.b.	20.40
Detroit, f.o.b.	19.40
New England, del'd	23.35
Seaboard, N. J., f.o.b.	21.50
Philadelphia, f.o.b.	21.05
Swedeland, Pa., f.o.b.	21.00
Painesville, Ohio, f.o.b.	20.90
Erie, del'd	$21.50 to 23.50
Cleveland, del'd	22.45
Cincinnati, del'd	21.50
St. Paul, f.o.b.	23.50
St. Louis, del'd	20.98
Birmingham, del'd	18.66

REFRACTORIES

(F.o.b. Works)

Fire Clay Brick

Carloads, Per 1000

First quality, Pa., Md., Ky., Mo., Ill. (except Salina, Pa., add $5)	$80.00
No. 1 Ohio	74.00
Sec. quality, Pa., Md., Ky., Mo., Ill.	74.00
No. 2 Ohio	66.00
Ground fire clay, net ton, bulk (except Salina, Pa., add $1.50)	11.50

Silica Brick

Mt. Union, Pa., Ensley, Ala.	$80.00
Childs, Pa.	84.00
Hays, Pa.	85.00
Chicago District	89.00
Western, Utah and Calif.	95.00
Super Duty, Hays, Pa., Athens, Tex.	85.00
Silica cement, net ton, bulk, Eastern (except Hays, Pa.)	$13.75 to 14.00
Silica cement, net ton, bulk, Hays, Pa.	16.00
Silica cement, net ton, bulk, Ensley, Ala.	15.00
Silica cement, net ton, bulk, Chicago District	14.75
Silica cement, net ton, bulk, Utah and Calif.	21.00

Chrome Brick

Per Net Ton

Standard chemically bonded, Balt., Chester	$69.00

Magnesite Brick

Standard, Balt. and Chester	$91.00
Chemically bonded, Balt. and Chester	80.00

Grain Magnesite

Std. ⅜-in. grains

Domestic, f.o.b. Balt. and Chester, in bulk, fines removed	$56.50
Domestic, f.o.b. Chewelah, Wash., in bulk with fines	$30.50 to 31.00
in sacks with fines	35.00 to 35.50

Dead Burned Dolomite

F.o.b. producing points in Pennsylvania, West Virginia and Ohio, per net ton, bulk. Midwest, add 10¢; Missouri Valley, add 20¢ .. $12.2

WAREHOUSE PRICES

Base prices, f.o.b. warehouse, dollars per 100 lb.
(Metropolitan area delivery, add 15¢ to base price except Cincinnati and New Orleans (*), add 10¢; New York, add 20¢.)

CITIES	SHEETS			STRIP		PLATES	SHAPES	BARS		ALLOY BARS			
	Hot-Rolled	Cold-Rolled (15 gage)	Galvanized (10 gage)	Hot-Rolled	Cold-Rolled		Standard Structural	Hot-Rolled	Cold-Finished	Hot-Rolled, A 4615 As-rolled	Hot-Rolled, A 4140-50 Ann.	Co'd-Drawn A 4615 As-rolled	Cold-Drawn, A 4140-50 Ann.
Baltimore	5.31	6.21-6.41	6.95-7.11	5.37	....	5.56	5.38	5.42	6.16	....	10.10	....	....
Birmingham	5.05	....	6.45	5.05	6.68	5.25	5.00	5.00	6.68	....	....	....	....
Boston	5.55	6.45-6.75	7.71-7.85	5.65-5.95	6.75	5.80	5.42	5.52	6.27	9.64-9.82	10.04-10.07	11.23-11.27	11.47-11.52
Buffalo	.85	5.00-5.75	7.26-7.70	5.29-5.65	6.35-7.27	5.35	5.10	5.05-5.15	5.90	9.70-9.73	9.95-9.98	11.15-11.18	11.40-11.43
Chicago	4.85	5.75	7.10	4.85	6.68	5.10	.90	4.90	5.70	9.35-9.50	9.60-9.75	10.80-10.90	11.05-11.15
Cincinnati	5.16-5.28*	6.13*-6.18	7.53	5.28*-5.55	....	5.53*-5.63	5.40*-5.48	5.33*-5.55	6.09*-6.10	9.74	9.99	11.19	11.44
Cleveland	4.98-5.16	5.75-6.06	7.20-7.48	5.03-5.15	....	5.37-5.54	5.16-5.47	5.17-5.34	5.90-5.97	9.49-9.66	9.74-9.91	10.95-11.07	11.19-11.32
Detroit	5.28-5.32	6.07-6.18	7.53-7.58	5.28-5.47	6.27-6.58	5.53-5.57	5.40	5.33-5.55	6.01-6.10	9.69-9.82	9.94-10.07	11.11-11.14	11.35-11.39
Houston	6.50-6.70	....	8.50	7.00	....	6.70	6.55	6.65	7.60	10.30	10.25	11.45	11.70
Indianapolis	5.15	6.05	7.39	5.15	6.25	5.40	5.20	5.35	6.50	....	....	....	....
Los Angeles	6.45-6.60	7.90-8.05	8.75-8.90	6.65-6.80	9.35[5]	6.15	5.95-6.10	6.10-6.25	7.95[14]-9.35	10.90-11.60	10.85-11.55	12.40-12.95	12.85-13.20
Memphis	5.75	6.60	....	5.95	6.80	5.95	5.75	5.75	6.50	....	....	....	....
Milwaukee	5.03	5.93	7.28	5.38	6.86	5.28	5.08	5.08	5.87-5.88	9.53	9.78	10.98	11.23
New Orleans	5.95*	6.75*	....	6.15*	....	6.15*	5.95*	5.95*	6.65*	....	....	....	....
New York	5.40-5.51	6.46	7.71-7.86	5.62-5.98	....	5.70-6.00	5.33-5.61	5.57-5.80	6.41-6.61	9.73-9.93	9.98-10.18	11.18-11.38	11.43-11.63
Norfolk	5.80	....	....	6.05	....	6.05	6.05	6.05	7.05	....	....	....	....
Omaha	5.98	....	9.89	5.98	....	6.23	6.03	6.03	6.83	....	....	....	....
Philadelphia	5.32	6.49	7.48-7.58	5.60	6.69	5.53	5.25	5.55	6.34	9.64-9.69	9.89	10.94	11.19
Pittsburgh	4.85	5.75[1]	7.15	5.00	6.00	5.05	4.90	4.90	5.65	9.35	9.60	10.80	11.05-11.30
Portland	6.50[6]-6.60	8.00[1]	8.80-9.20	6.85[6]	....	6.30[6]	6.35[6]	6.35[6]	8.25[14]	10.50[6]	10.10[6]	....	....
Salt Lake City	7.05-8.00	8.20	7.90-9.06	7.10-7.70	....	5.75-6.85	6.65-7.00	6.95-7.25	7.40-7.55	....	....	....	....
San Francisco	6.15[5]	7.50[2]	8.10[2]	6.75[5]	8.25[5]	6.35[5]	5.90[5]	5.90[5]	7.55	10.90[15]	10.85[15]	12.40[15]	12.65[15]
Seattle	6.20[4]-7.10[4]	7.75[2]-8.65[2]	7.65-9.15[2]	6.55[4]-6.70[4]	....	6.20-6.35[4]	6.15-6.30[4]	6.05[4]-6.20[4]	8.00[14]-8.15[14]	....	10.30[15]-11.35[15]	....	12.00[15]-14.10[15]
St. Louis	5.21-5.37	6.12-6.27	7.47-7.52	5.22-5.97	8.68	5.47-5.62	5.27-5.42	5.27-5.92	6.07-6.22	9.72	9.97	....	11.42
St. Paul	5.44	6.19-6.34	7.74	5.44	6.82	5.64-6.69	5.49	5.49	6.29	....	....	....	....

BASE QUANTITIES

Standard unless otherwise keyed on prices.

HOT-ROLLED:
Sheets, strip, plates, shapes and bars, 400 to 1999 lb.

COLD-ROLLED:
Sheets, 400 to 1999 lb; strip, extras on all quantities bars 1000 lb and over.

ALLOY BARS:
1000 to 1999 lb.

GALVANIZED SHEETS:
450 to 1499 lb.

EXCEPTIONS:
(1) 400 to 1499 lb; (2) 450 to 1499 lb; (3) 300 to 4999 lb; (4) 300 to 9999 lb; (5) 2000 lb and over; (6) 1000 lb and over; (7) 400 to 14,999 lb; (8) 400 lb and over; (9) 500 to 1999 lb; (10) 500 to 999 lb; (11) 400 to 3999 lb; (12) 450 to 3749 lb; (13) 400 to 1999 lb; (14) 1500 lb and over; (15) 1000 to 4999 lb; (16) 4000 lb and over; (17) up to 1999 lb; (18) 1000 to 1499 lb.

PIG IRON PRICES

Dollars per gross ton. Delivered prices represent minimums. Delivered prices do not include 3 pct tax on freight nor the 6 pct increase on total freight charges in the Eastern Zone (5 pct Southern Zone, 4 pct Western Zone), effective Jan. 11, 1949.

PRODUCING POINT PRICES

Producing Point	Basic	No. 2 Foundry	Malleable	Bessemer	Low Phos.
Bethlehem	48.00	....	....	....	....
Birmingham	42.88	43.38	....	....	....
Buffalo	46.00	46.50	47.00	....	....
Chicago	46.00	46.50	46.50	47.00	....
Cleveland	46.00	46.50	46.50	47.00	51.00
Duluth	46.00	46.50	46.50	47.00	....
Erie	46.00	46.50	46.50	47.00	....
Everett	....	52.50	53.00	....	....
Granite City	47.90	48.40	48.90	....	....
Ironton, Utah	46.00-47.00	46.50-47.50	....	....	....
Lone Star, Texas	46.00	46.50†	....	....	....
Neville Island	46.00	46.50	46.50	....	....
Geneva, Utah	46.00	46.50	....	....	....
Sharpsville	46.00	46.50	46.50	47.00	....
Steelton	48.00	48.50	49.00	49.50	54.00
Struthers, Ohio	46.00	....	....	....	....
Swedeland	48.00	48.50	49.00	49.50	....
Toledo	46.00	46.50	46.50	47.00	....
Troy, N. Y.	....	....	....	....	54.00
Youngstown	46.00	46.50	46.50	....	....

DELIVERED PRICES (BASE GRADES)

Consuming Point	Producing Point	Freight Rate	Basic	No. 2 Foundry	Malleable	Bessemer	Low Phos.
Boston	Everett	$0.50 Arb.	....	53.00	53.50	....	....
Boston	Steelton	6.27	54.27	54.77	55.27	55.77	60.27
Brooklyn	Steelton	5.48	....	53.98	54.48	54.98	59.48
Cincinnati	Birmingham	6.09	48.97	49.46	....	....	....
Jersey City	Steelton	3.67	....	52.17	52.67	53.17	57.67
Los Angeles	Geneva-Ironton	6.93	52.93-53.93	53.43-54.43	....	....	....
Mansfield	Cleveland-Toledo	3.03	49.03	49.53	49.53	50.03	54.03
Philadelphia	Bethlehem	2.30	50.30	....	....	....	....
Philadelphia	Swedeland	1.31	49.31	49.81	50.31	50.81	....
Philadelphia	Steelton	2.98	50.98	51.48	51.98	52.48	56.98
San Francisco	Geneva-Ironton	6.93	52.93-53.93	53.43-54.43	....	....	....
Seattle	Geneva-Ironton	6.93	52.93-53.93	53.43-54.43	....	....	....
St. Louis	Granite City	0.75 Arb.	48.65	49.15	49.65	....	....
Gulf Ports	Lone Star, Texas	....	50.50	51.00†			

† Low Phos, Southern Grade

Producing point prices are subject to switching charges; silicon differential (not to exceed 50¢ per ton for each 0.25 pct silicon content in excess of base grade which is 1.75 to 2.25 pct for foundry iron); phosphorus differentials, a reduction of 38¢ per ton for phosphorus content of 0.70 pct and over manganese differentials, a charge not to exceed 50¢ per ton for each 0.50 pct manganese content in excess of 1.00 pct. $2 per ton extra may be charged for 0.5 to 0.75 pct nickel content and $1 per ton extra for each additional 0.25 pct nickel.

Silvery iron (blast furnace) silicon 6.01 to 6.50 pct. C/L per g.t., f.o.b. Jackson, Ohio —$59.50; f.o.b. Buffalo, $60.75. Add $1.25 per ton for each additional 0.50 pct Si up to 17 pct. Add 50¢ per ton for each 0.50 pct Mn over 1.00 pct. Add $1.00 per ton for 0.75 pct or more P. Bessemer ferrosilicon prices are $1.00 per ton above silvery iron prices of comparable analysis.

Charcoal pig iron base price for low phosphorus $66.00 per gross ton, f.o.b. Lyles, Tenn. Delivered Chicago, $73.78. High phosphorus charcoal pig iron is not being produced.

Ferromanganese

78-82% Mn, Maximum contract base price, gross ton, lump size.

F.o.b. Birmingham	$174
F.o.b. Niagara Falls, Alloy, W. Va., Welland, Ont.	$172
F.o.b. Johnstown, Pa.	$174
F.o.b. Sheridan, Pa.	$172
F.o.b. Etna, Pa.	$175

$2.00 for each 1% above 82% Mn; penalty, $2.00 for each 1% below 78%.

Briquets—Cents per pound of briquet, delivered, 66% contained Mn.

Carload, bulk	10.45
Ton lots	12.05
Less ton lots	12.95

Spiegeleisen

Contract prices gross ton, lump, f.o.b.

	16-19% Mn 3% max. Si	19-21% Mn 3% max. Si
Palmerton, Pa.	$64.00	$65.00
Pgh. or Chicago	65.00	66.00

Manganese Metal

Contract basis, 2 in. x down, cents per pound of metal, delivered.

96% min. Mn, 0.2% max. C, 1% max. Si, 2% max. Fe.

Carload, packed	35.5
Ton lots	37.0

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, cents per pound.

Carloads	28
Ton lots	30
Less ton lots	32

Low-Carbon Ferromanganese

Contract price, cents per pound Mn contained, lump size, delivered.

	Carloads	Ton	Less
0.07% max. C, 0.06% P, 90% Mn	25.25	27.10	28.30
0.10% max. C	24.75	26.60	27.80
0.15% max. C	24.25	26.10	27.30
0.30% max. C	23.75	25.60	26.80
0.50% max. C	23.25	25.10	26.30
0.75% max. C, 7.00% max. Si	20.25	22.10	23.30

Silicomanganese

Contract basis, lump size, cents per pound of metal, delivered, 65-68% Mn, 18-20% Si, 1.5% max. C. For 2% max. C, deduct 0.2¢.

Carload bulk	8.95
Ton lots	10.60
Briquet, contract basis, carlots, bulk delivered, per lb of briquet	10.30
Ton lots	11.90
Less ton lots	12.80

Silvery Iron (electric furnace)

Si 14.01 to 14.50 pct, f.o.b. Keokuk, Iowa, openhearth $84.00, foundry, $85.00; $78.50 f.o.b. Niagara Falls; Electric furnace silvery iron is not being produced at Jackson. Add $1.00 per ton for each additional 0.50% Si up to and including 18%. Add $1.00 for each 0.50 pct. Mn over 1 pct.

Silicon Metal

Contract price, cents per pound contained Si, lump size, delivered, for ton lots packed.

96% Si, 2% Fe	20.70
97% Si, 1% Fe	21.10

Silicon Briquets

Contract price, cents per pound of briquet, bulk, delivered, 40% Si, 1 lb Si briquets.

Carload, bulk	6.30
Ton lots	7.90
Less ton lots	8.80

Electric Ferrosilicon

Contract price, cents per pound contained Si, lump size, bulk, in carloads, delivered.

25% Si	18.50
50% Si	11.30
75% Si	13.50
85% Si	14.65
90-95% Si	16.50

Calcium Metal

Eastern zone contract prices, cents per pound of metal, delivered.

	Cast	Turnings	Distilled
Ton lots	$2.05	$2.95	$3.75
Less ton lots	2.40	3.30	4.55

Ferrochrome

Contract prices, cents per pound, contained Cr, lump size, bulk, in carloads, delivered. (65-72% Cr, 2% max. Si)

0.06% C	28.75
0.10% C	28.25
0.15% C	28.00
0.20% C	27.75
0.50% C	27.50
1.00% C	27.25
2.00% C	27.00
65-69% Cr, 4-9% C	20.50
62-66% Cr, 4-6% C, 6-9% Si	21.35

Briquets — Contract price, cents per pound of briquet, delivered, 60% chromium.

Carload, bulk	13.75
Ton lots	15.25
Less ton lots	16.15

High-Nitrogen Ferrochrome

Low-carbon type: 67-72% Cr, 0.75% N. Add 5¢ per lb to regular low carbon ferrochrome price schedule. Add 5¢ for each additional 0.25% N.

S. M. Ferrochrome

Contract price, cents per pound chromium contained, lump size, delivered.

High carbon type: 60.65% Cr, 4-6% Si, 4-6% Mn, 4-6% C.

Carloads	21.60
Ton lots	23.75
Less ton lots	25.25

Low carbon type: 62-66% Cr, 4-6% Si, 4-6% Mn, 1.25% max. C.

Carloads	27.75
Ton lots	30.05
Less ton lots	31.85

Chromium Metal

Contract prices, cents per lb chromium contained packed, delivered, ton lots. 97% min. Cr, 1% max. Fe.

0.20% max. C	1.09
0.50% max. C	1.05
9.00% min. C	1.04

Calcium—Silicon

Contract price per lb of alloy, lump, delivered.

30-33% Ca, 60.65% Si, 3.00% max. Fe.

Carloads	17.90
Ton lots	21.00
Less ton lots	22.50

Calcium—Manganese—Silicon

Contract prices, cents per lb of alloy, lump, delivered.

16-20% Ca, 14-18% Mn, 53-59% Si.

Carloads	19.25
Ton lots	21.55
Less ton lots	22.55

CMSZ

Contract price, cents per pound of alloy, delivered.

Alloy 4: 45-49% Cr, 4-6% Mn, 18-21% Si, 1.25-1.75% Zr, 3.00-4.5% C.

Alloy 5: 50-56% Cr, 4-6% Mn, 13.50-16.00% Si, 0.75 to 1.25%Zr, 3.50-5.00% C.

Ton lots	19.75
Less ton lots	21.00

V Foundry Alloy

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis. V-5: 38-42% Cr, 17-19% Si, 8-11% Mn.

Ton lots	15.75¢
Less ton lots	17.00¢

Graphidox No. 4

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis. Si 48 to 52%, Ti 9 to 11%, Ca 5 to 7%.

Ton lots and carload packed	18.00¢
Less ton lots	19.50¢

SMZ

Contract price, cents per pound of alloy, delivered. 60-65% Si, 5-7% Mn, 5-7% Zr, 20% Fe, ½ in. x 12 mesh.

Ton lots	17.25
Less ton lots	18.50

Other Ferroalloys

Ferrotungsten, standard, lump or ¼ x down, packed, per pound contained W, 5 ton lots, delivered	$2.25
Ferrovanadium, 35-55%, contract basis, delivered, per pound, contained, V.	
Openhearth	$2.90
Crucible	3.00
High speed steel (Primos)	3.10
Vanadium pentoxide, 88-92% V_2O_5 contract basis, per pound contained V_2O_5	$1.20
Ferrocolumbium, 50-60% contract basis, delivered, per pound contained Cb.	
Ton lots	$2.90
Less ton lots	2.95
Ferromolybdenum, 55-75%, f.o.b. Langeloth, Pa., per pound contained Mo.	$1.10
Calcium molybdate, 45-50%, f.o.b. Langeloth, Pa., per pound contained Mo.	96¢
Molybdenum oxide briquets, f.o.b. Langeloth, Pa., per pound contained Mo.	95¢
Ferrotitanium, 40%, regular grade, 10% C max., f.o.b. Niagara Falls, N. Y., freight allowed east of Mississippi and north of Baltimore, ton lots, per lb contained Ti	$1.28
Ferrotitanium, 25%, low carbon, f.o.b. Niagara Falls, N. Y., freight allowed east of Mississippi and north of Baltimore, ton lots, per lb contained Ti	$1.40
Less ton lots	1.45
Ferrotitanium, 15 to 19%, high carbon, f.o.b. Niagara Falls, N. Y., freight allowed east of Mississippi and north of Baltimore, carloads, per net ton	$160.00
Ferrophosphorus, electrolytic, 23-26%, carlots, f.o.b. Siglo, Mt. Pleasant, Tenn., $3 unitage, per gross ton	$65.00
10 tons to less carload	75.00
Zirconium, 35-40%, contract basis, f.o.b. plant, freight allowed, per pound of alloy.	
Ton lots	21.00¢
Zirconium, 12-15%, contract basis, lump, delivered, per pound of alloy.	
Carload, bulk	6.60¢
Alsifer, 20% Al, 40% Si, 40% Fe, contract basis, f.o.b. Suspension Bridge, N. Y.	
Carload	8.15¢
Ton lots	9.55¢
Simanal, 20% Si, 20% Mn, 20% Al, contract basis, f.o.b. Philo, Ohio, freight allowed, per pound	
Carload, bulk	11.00¢
Ton lots, packed	11.25¢
Less ton lots	11.75¢

Boron Agents

Contract prices per pound of alloy, delivered.

Ferroboron, 17.50% min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C, 1 in. x D.	
Ton lot	$1.20
Manganese—Boron 75.00% Mn, 15-20% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C, 2 in. x D, delivered.	
Ton lots	$1.67
Less ton lots	1.79
Nickel—Boron 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni, delivered.	
Less ton lots	$1.80
Silcaz, contract basis, delivered.	
Ton lots	45.00¢
Grainal, f.o.b. Bridgeville, Pa., freight allowed, 100 lb and over.	
No. 1	93¢
No. 6	63¢
No. 79	45¢
Bortam, f.o.b. Niagara Falls	
Ton lots, per pound	45¢
Less ton lots, per pound	50¢
Carbortam, f.o.b. Suspension Bridge, N. Y.; freight allowed, Ti 15-18%, B 1.00-1.50%, Si 2.5-3.0%, Al 1.0-2.0%.	
Ton lots, per pound	8.625¢
Borosil, f.o.b. Philo, Ohio, freight allowed, B 3-4%, Si 40-45%, per lb contained B	$6.25